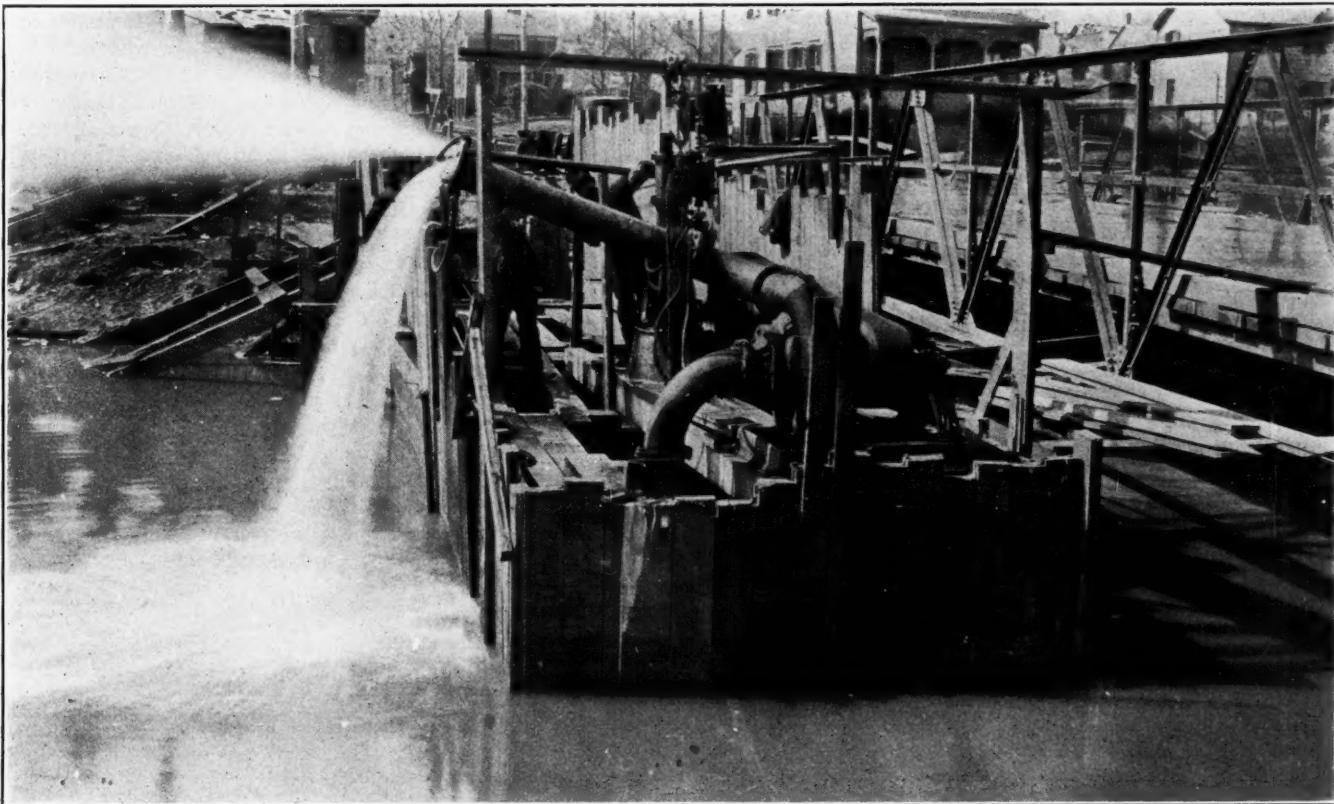


# Municipal Journal And Engineer

VOLUME XXVIII

NEW YORK, APRIL 6, 1910

No. 14



COFFER DAM AT RIVER CROSSING OF LATERAL SEWER

## INTERCEPTING SEWER AT ELIZABETH, N. J.

To Prevent Pollution of Elizabeth River—Siphon River Crossings, Cofferdam Construction—Excavating Trench with Derrick and Bucket—Connections Between Old Combined Sewers and Interceptor

THE first intercepting sewer of its kind in New Jersey planned for the purpose of accomplishing stream purification is now half completed. It will collect the sanitary sewage of the city of Elizabeth and deliver it into a joint outlet sewer not far from its point of discharge into Staten Island Sound. This outlet sewer was built about ten years ago by seven New Jersey municipalities which otherwise would have had to build disposal plants, and when the municipalities interested desired to secure rights of way through Elizabeth that city stipulated that it should have the right to discharge a sanitary sewer into it at a specified point.

The city of Elizabeth is situated on the Elizabeth river about four miles from Staten Island Sound at about tidal limits. The intervening country is marsh land, most of it overflowed by exceptionally high tides. The city is built upon low hills formed of strata of red shale rock covered to varying depths

with sand, clay and disintegrated stone. The river is navigable to boats drawing about six feet of water and is of considerable commercial value for bringing in coal, building materials and miscellaneous supplies. Improvement of this river with a view to securing greater depth and constructing docks is in prospect. The Federal Government has, however, refused to make any improvement until the sanitary conditions are modified. When this is done by the completion of the intercepting sewer the river will no doubt be deepened and widened by the joint action of the city, State and Federal government. The sanitary condition alone of the river, however, is such as to justify the expenditure of the \$225,000 involved. Nearly all of the sewage from Elizabeth's population of 65,000 is delivered into the river at more than 60 points. The appearance of the water, particularly at low tide, is offensive and the odors from it are such that, in the lower section of the town at least, property has



MAP OF ROUTE OF INTERCEPTING SEWER

depreciated and much land suitable for manufacturing and residence purposes is unoccupied.

In planning the intercepting sewer, City Engineer W. H. Luster had in view the probable population and needs of the city for 100 years to come. The total area drained is about 30 square miles. The engineer figured that each house lot would have a frontage of 25 feet, which would give an average of 12½ lots to the acre. Each house was figured to contain five inhabitants, consuming 50 gallons of water each per day. The intercepting sewer is circular 44 inches in diameter at its outlet and with a fall of .09 foot per hundred feet the sewage will have a velocity of about 3 feet per second.

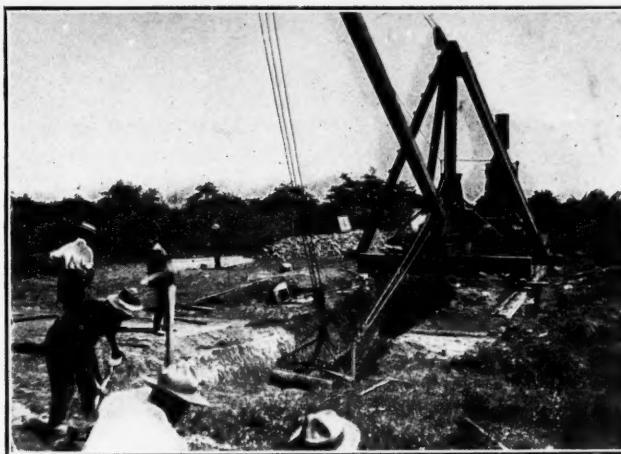
The Elizabeth river winds through the city in a general southerly direction. The main intercepting sewer begins at Sta. 126 (Sta. 0 is at the junction with the joint outlet sewer), at a point about 500 feet east of the river and at an elevation of 6.2 above mean low tide and about 20 feet below the surface of the ground. At this point the sewer is 28 inches in diameter and it receives the largest lateral sewer, which drains the best residential section of the city. The sewer follows the general course of the river at a distance of 500 feet or less from it and has a grade of .09 foot per hundred feet. For a distance of 1500 feet it traverses the main business street. At a short distance south of the business section of the city, just opposite the City Hall, at Sta. 83, it crosses by two iron siphon pipes to the west side of the river. The invert of the sewer at this station is at elevation —2.72 and the top of the siphon pipes will be at elevation —6.0, this elevation being approved by the War Department. The invert of the sewer at the west end of the siphon is —3.65. This depth of siphon will permit the river to be dredged to a depth of six feet of water at low tide and about twelve feet at high tide.

On the west side of the river the sewer parallels it, generally from 100 to 500 feet distant from it. At Sta. 37 the sewer is 40 inches in diameter and the invert is at elevation —7.7. Here a pumping station equipped with three or more electrically operated pumps will lift the sewage to elevation 8.04, from which, by an average fall as before of .09 foot per hundred feet, it will flow through a 44-inch sewer into the joint outfall sewer at Sta. 0, elevation 4.71.

Included in the work now under construction is a south side lateral sewer which discharges into the main interceptor at Sta. 80, elevation 0.10, near the crossing of the Elizabeth river. This will collect the sewage from 17 sewers in the south and west portions of the city. The south side lateral begins at a point about 650 feet west of the river, at Sta. 40 + 37, elevation 10, about 15 feet below the surface of the ground. Here it is a 10-inch vitrified pipe and has a gradient of 0.25 per cent. Between stations 32 and 33 the diameter of the sewer is increased to 12 inches and below Sta. 10 + 60 at South street, where there is a drop of a foot, 15-inch pipe is used.

The existing sewer system receives both storm water and house drainage. Over forty of these old sewers will drain into the main intercepting sewer. Most of them are located a considerable distance above it, and at the crossings there will be placed in each of the old sewers a connecting pipe, valve and float. The float will be adjusted so that a cap, fitting into a vertical iron pipe leading to the intercepting sewer, will ordinarily be raised, allowing all the sanitary sewage to go to the intercepting sewer. When storm water is being received the float will rise, bringing the cap down and closing the inlet into the intercepting sewer. The storm water, together with the relatively small amount of house drainage, will then follow the existing sewers into the Elizabeth river. The outlets of these sewers, which are below high tide, will be provided with tidal gates preventing back water. These will be furnished by the Gibbey Company of Boston. The gates themselves are constructed of wood for the purpose of making a tight joint. They are suspended on two double jointed hinges at the top.

Alternative bids were received for constructing the intercepting sewer with reinforced concrete, Parmley concrete block, or brick. The bids for the concrete block were lowest and at first Council intended to accept that proposal. However, on



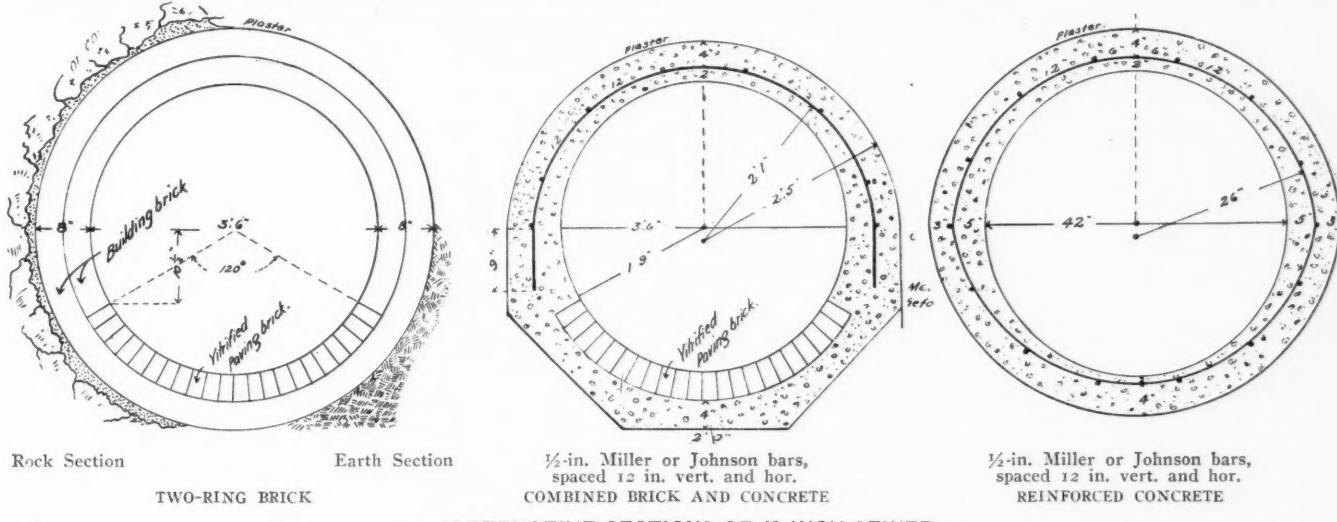
EXCAVATING TRENCH WITH PAGE BUCKET

further consideration and in view of the magnitude and importance of the work, it was thought that the most conservative method of construction would be preferable, even at greater expense, and the use of brick was decided upon. The sewer is accordingly being constructed of ordinary sewer brick, furnished by the Lenox Brick Company of Matawan, N. J., except that the lower third of the inner ring is laid with wire-cut

the trench. The contractors state that the machine did rapid and economical work, considerably more than 100 feet of ditch being dug in a day at times. A stiff-legged derrick with orange peel bucket followed behind the finished sewer work and re-filled the trench.

Spruce grillage was used in this section in the bottom of the trench, upon which the masonry rests. The grillage is made of parallel longitudinal sleepers bedded in the bottom of the trench, their size being 3 inches by 12 inches. All spaces between the grillage were rammed tight with earth. Upon the sleepers 3-inch spruce plank were laid transversely to the axis of the sewer and so close as to form a tight floor. Each plank extended across the full width of the excavation and was spiked to each sleeper by two wrought iron spikes 6 inches long. The grillage is flat and has the same longitudinal slope as the sewer.

In the construction of the sewer none but whole bricks of good quality were used, hard burned, with straight edges and square angles. The specifications required that the brick be culled as they were brought to the ground and all soft bricks and bats were immediately removed. Bricks were required to absorb not more than 12 per cent of their weight in water after being immersed 24 hours. The paving brick lining the lower one-third were specified to be equal to the best paving brick obtainable in the market, with true form, sharp edges and flat surfaces, and particular care was exercised in the se-



vitrified brick made by the Auburn, Pa., Shale Brick Company.

Actual construction was begun by the successful contractor, Wm. H. McCloud & Co., in August last. Work was begun at the joint intercepting sewer, where the Elizabeth interceptor is 44 inches in diameter. For a distance of 3100 feet the sewer runs through low marshy ground, most of it subject to overflow at very high tides, and proceeds along projected street lines. At the present time there are no buildings along this section, but lot connections have been put in and an assessment will be made on adjacent property. The same method of construction was employed throughout this section, which was completed a few months ago. The cut here was comparatively light, from 10 to 13 feet, and the excavated material was thrown on the bank alongside the trench and no shoring used. The Page excavating bucket was used on this work, in connection with a National Hoisting Company's hoisting engine and a derrick set on a bull-wheel, both in one housing. The boom was 40 feet long. The Page excavating bucket is generally rectangular in shape and long in proportion to its width and height. On the under edge at the front are a number of cutting teeth made of manganese steel. In operation the bucket is brought to the proper point over the excavation by the long boom and lowered to place. When in position to excavate it is pulled forward by a rope wound upon a drum and upward by the line from the boom, so as to make a sloping cut in the ditch. It is then elevated and the bull-wheel on which the derrick sits is revolved and the dirt deposited well away from

lection to see that only brick with perfectly flat surfaces were used. The choice by the contractor of a wire cut brick seems to have been a wise one in complying with the conditions. The absorption test required that after being broken in the middle and dried, the paving brick should not absorb more than 3 per cent of their own weight in water.

Before laying, each brick was thoroughly wet, and cleaned if necessary, and laid in a full joint of mortar on its bed, end and side at one operation, with joints in no case greater than  $\frac{3}{8}$ -inch. Broken joints, of course, were required in all cases and the



ROOF OF PUMPING STATION, NEARLY COMPLETED



USING CABLEWAY ON TWENTY-FOOT TRENCH

inside course laid to a line. The use of strong centers was specified in building the upper arch, and such as could be easily removed without disturbing the brick work. As a matter of fact, steel centers were generally used. The outside of the sewer was plastered with cement mortar, two parts sand to one of cement. An 8-inch underdrain was laid under the sewer and the amount of water carried by it during construction was large. The drain will be of no further use after the work is completed.

At the present time work is going on in the section between the pumping station, Sta. 37, and the crossing of the Elizabeth river at Sta. 82. The depth of cut in this section averages about 20 feet. The general character of the excavation completely changes in this distance. At the south end the country is marshy and the soil is soft and wet. Further along, the soil becomes more sandy and shale rock occurs near the bottom of the ditch. Towards the north end, near the river, the shale rock comes to the surface of the ground. From there north all the work will be in rock and the contractor will probably use the tunneling method throughout. The necessity of shoring the trench north of the pumping station prevented the further use of the Page bucket excavator. A Mead-Morrison cableway is in operation about 800 feet north of the pumping station and a Lambert cableway is in use a few hundred feet south of the Elizabeth river crossing. The Mead-Morrison cableway has 30-foot towers and a span of 350 feet, and the Lambert cableway 34-foot towers and a span of 450 feet.

The sheet piling is 2-inch spruce. It is left in place when driven down below the spring of the arch. The line of the sheeting is unusually accurate and true, as shown in the illustration. In driving the piling care has always been taken to place a cap over the plank, with the result that there is not a broken piece of sheeting to be seen anywhere along the line.

Timber braces are used of the required length without any sewer jacks, although the contractors state they have a thousand dollars worth of the latter in stock.

A large amount of water is being handled near the sewage pumping station. A 6-inch Bush pump, manufactured by Jesse Craft, takes the water from the 8-inch under drain and delivers it into an old sewer crossing the interceptor at this point. Mr. Brennan, the managing contractor, says that this pump has been in nearly constant use for three years and has cost nothing for repairs, although now it needs a new shaft. In addition to the centrifugal pump there is an 8-inch Pulsometer and an Emerson sinking pump, both installed in sumps near the point where the work is going on.

The Elizabeth river simplifies the question of supplies, as brick are brought in boats to points very close to the work. Concrete stone might be brought in the same way if loaded on small scows, but prevailing prices for crushed stone are made for delivery in large scows holding 500 cubic yards or more, which would be too large for use in this river, a consideration which probably figured largely in comparative estimates of the cost of concrete or brick for the construction of this sewer. Other materials and supplies are hauled in wagons over ground that is often very soft.

In this portion of the work a timber cradle is built, in which the invert is laid, the longitudinal strips of the cradle conforming closely to the shape of the sewer. An alternative method is employed where the bottom is rock of such a nature as to break irregularly, the bed being surfaced up with concrete. Although the specifications provide for water-proofing the sewer, it has so far not been found necessary, inspection having shown that very little water seeps in. Occasionally joints have been found through which water oozes, in which case a piece of rope saturated with cement grout is forced in and the leak is stopped.

As the work proceeds toward the north, shale rock is encountered in increasing amounts. This rock varies greatly in hardness. At the top of the stratum it is more or less disintegrated and can be removed with pick and shovel, but at greater depths it is so hard that blasting is necessary. In this case the holes are drilled in pairs, four holes being drilled, charged and blasted at a time. Blasting is generally done at night. When the rock occurs throughout the whole depth of the trench, little more than half of it can be returned to the trench, and the balance must be disposed of otherwise by the contractor.

The main intercepting sewer crosses the river only once, but there is a crossing a few feet south of this made by a lateral sewer. Work on the crossing for this lateral is shown in the cut. A coffer dam is built, extending about half way across the river (the channel has to be kept open for boats at all



PAGE BUCKET AND ORANGE-PEEL BUCKET USED IN EXCAVATING TRENCH



COFFER DAM AT RIVER CROSSING  
View from Shore End

times), in the following manner. Three-inch grooved, long leaf yellow-pine planks are driven down to the rock, brooming out where they strike the high points of the rock which helps to make a close joint. White pine splines are driven in the grooves which soon swell up and make the sheeting nearly water tight. Bags filled with sand are thrown into the river alongside the sheeting. The coffer dam is sufficiently tight for the purpose, a 6-inch centrifugal Bush pump operating only part of the time sufficing to keep the trench dry. The excavation, partly in mud and partly in rock, is handled by a stiff-leg derrick. In this trench two iron pipes are laid and bedded in concrete. A gas pipe is also laid in the same trench for the local company. There is a manhole at each side of the river where the vitrified pipe construction is changed to iron, and where the drop in grade is made. The upper manhole is carried down below the level of the siphon pipes so as to form a pit to retain dirt and other material that might stop up the siphon.

The pumping plant will consist of three electric pumps, each of a capacity of 2,000 gallons per minute, which will be thrown in and out of service automatically. These will be described next week.

#### ROADWAY WIDTHS AND STREET LENGTHS

THE idea that the width of a roadway should be determined to a considerable extent by the amount of traffic which it is to carry is one which is commonly recognized and frequently used as a basis of street designing. The method of determining this amount of traffic, however, is generally a difficult one and frequently a matter of guesswork only. Pasadena, Cal., has adopted a basis of proportioning roadway and sidewalk widths which is novel, so far as we know. This is apparently the assumption that the roadway traffic on the street is largely proportional to the length of that street; that is, the greatest amount of traffic follows the longest highways. In general the rule embodying this idea is that, for streets having a total width of 65 feet or less, the roadway shall have a certain minimum width up to a total street length of 1,500 feet; that for lengths from 1,500 to 3,000 feet this width should be increased by two feet; between 3,000 and 5,000 feet by two additional feet and if over 5,000 feet long a third increment of two feet shall be added. The minimum roadway widths vary from 20 feet on a 40-foot street to 30 feet on a 65-foot street. For streets between 70 and 100 feet total width, the first increment in roadway width is four feet and the other two are each two feet, except that for a 100-foot street the second increment also is four feet and the third two feet. This rule does not apply to streets having car lines, and there are a number of individual exceptions, and council retains the right to make other exceptions when it seems best.

The idea is an interesting one, and we presume has been worked out in such a way as to meet a number of questions which occur to us, such as the method of determining the future length of a street, seeing that many of them will undoubtedly be extended with the growth of the city.

#### ACIDS, ALKALIES AND CONCRETE SEWERS

##### Deterioration of Concrete Structures Due to Alkalies, Acids and Sewer Gas—Theory of Action—Methods Suggested for Protection

A FEW weeks ago there was read before the American Society of Civil Engineers by Mr. G. G. Anderson a paper entitled "The Effect of Alkali on Concrete," in the discussion of which some facts were brought out concerning the effects of acids also upon concrete structures, especially sewers. The paper in part rehearsed the conditions and experiments which were described in our issue of Dec. 23, 1908, but many additional cases were cited and some theories advanced as to the cause of the action. We present herewith a brief synopsis of both the paper and discussion.

In a paper read before the same society in 1908 reference had been made to the fact that in some irrigation works in the west a crumbling or disintegration of the concrete had been found taking place, due presumably to the action of alkali in the soil. Mr. Jewett, the cement expert of the Reclamation Service, in a paper before the American Society for Testing Materials in 1908 stated:

On the Sun River project \* \* \* its effect has been seen in the disintegration of a number of small structures, such as pipe culverts, which are partially submerged in the small streams carrying the drainage of the surrounding country. The effect of this water in causing the disintegration of the concrete is noticed, both in the softening of the material where constantly submerged for a period of three or four months, and also more particularly in the breaking up of the structure at the line where the water rises and falls, or, in other words, where there is a submersion, followed by a drying out, followed by another submersion, etc. This process brings about a breaking up of the structure, similar in appearance to that of the effect of freezing, only much more severe. It is described by the engineer in charge of this work as follows:

On examination of some of the concrete culverts which have been in place in alkali water for three or four months, the part under water is much softer than the part above water, but the greatest effect of the alkali seems to be at the water surface. Have examined pieces of these culverts taken from below water level and found, by microscopic examination, minute crystals which disintegrate on being exposed to the air and become a fine powder. This process of crystallization has an enormous expansive force, the same as freezing, and this undoubtedly has an enormous disintegrating effect. One culvert which had been in alkali water several months had no strength at all and was like so much sand and mud at the water level.

Reference was made to the investigations of Prof. William P. Headden, of the Colorado State Agricultural College, who stated that he had obtained fragments of tile which had been laid but eight or nine months, some of which had disintegrated to such an extent as to be simply a white putty-like mass mixed with sand, while in others the interior portions had wholly decomposed, but the outer and inner surfaces were in comparatively good condition. His explanation of the latter phenomenon was that the inner and outer surfaces were richer in cement and more thoroughly compacted than the interior portions, and that porosity increased the action of the alkali. Both Mr. Jewett and Professor Headden found the decomposing action to be similar to that of sea water, in which sulphate of magnesium is believed to be the principal agent. There is present magnesium chloride also, but it has not been established that this has any deleterious action on cement. It is believed that in the case of the alkaline soils or water, in which the salts are largely sulphate of lime, magnesia, soda, alumina, iron and potash, and carbonates of soda and potash, that the sulphates are the agents of the decomposition.

Mr. Anderson had experiences somewhat similar to that with the Great Falls, Mont., sewer as described in a previous article in MUNICIPAL JOURNAL. The discharge from Lake Loveland is through a tunnel three-fourths of a mile long, nearly all of which is in stratified shale. Owing to the fact that the water would travel at high velocity and that the rock was of a character to be decomposed thereby, the tunnel was lined in the invert with two rings of well-burned brick and the arch was made of concrete. An underdrain also was carried under the lining. In this case there was no decomposition of the concrete arch lining. In contrast with this was a small head gate which had been built about two years and the

floor of which had been of concrete about 6 inches thick. The author found this entirely decomposed so that it could be crushed readily in the hand. The uprights also, up to about the normal height of the water, showed disintegration. The apron at the outlet of the reservoir was found to be disintegrated in the same way. It had been reinforced and the reinforcing material was exposed and bright while the concrete mass was almost completely pulverized.

Professor Headden had stated that if the alkaline ground water could be kept drained away from concrete structures there would be no difficulty; but Mr. Anderson thinks that "it would be too much to hope that the drainage around structures would effectively solve the difficulty of alkali in contact with concrete, but it will aid in resisting the action of the agencies at operation."

In the discussion Mr. R. A. Hart, Assistant Drainage Engineer of the Department of Agriculture, described at some length laboratory tests which had been made by him on the effect of alkaline waters, both in the mixing of cement and when cement briquettes were stored in it, which experiments had been conducted in the mechanical laboratory of the University of Utah. Pats were made of neat cement wet up with sodium chloride, carbonate and sulphate, each in four different strengths, and with ordinary faucet water. In general, tests of both pats and briquettes showed no deterioration due to the use of alkaline water, and in some cases the briquettes were stronger than those mixed with non-alkaline water. Where, however, sand briquettes were made and stored in solutions of sodium chloride, carbonate and sulphate, there was found a remarkable weakening in the case of the last; those stored in a 10 per cent solution of sodium sulphate having only about one-eighth the strength of those stored in non-alkaline water. On the assumption that deterioration of the sand briquettes was due to the greater porosity of the material, experiments were conducted with the use of waterproof cement, the mixture having been secured from a St. Louis firm.

While these had not been conducted for a sufficient length of time to give any conclusive results, they showed no apparent deterioration after three months' storage in the alkaline solutions.

Dr. Rudolph Hering adduced several instances and the opinions of investigators in support of the theory that the action was largely, if not entirely, due to sulphuric acid; sulphur being deposited on, or in, the concrete from the sodium sulphate or in some instances from other sulphates or from sulphuretted hydrogen gas; the sulphur being later taken into solution as sulphuric acid. "Experiences recorded in Montana, Colorado and Europe indicate pretty satisfactorily that cement can be completely destroyed by alkaline or acid waters coming in contact with it. As the same results have followed the use of quite different brands of cement, and in different countries, it may be concluded that the destroying cause is a broad one. Evidence points strongly to the fact that the porosity of the material aggravates the evil. The deterioration is generally greater the more porous the mortar, as often found in the interior of the mass, while at the surface the cement often forms a firmer and richer coating, and is very little if at all affected unless there is merely a white alkaline efflorescence.

"These conditions are quite consistent with the conclusion that the surface layers, through plastering and troweling, have been compressed and have had their porosity decreased as the layers were made denser. The absorption of alkaline waters, and, therefore, their detrimental effect, is correspondingly reduced."

Dr. Hering finds that the obtaining of greater density and the external application and incorporation with the cement of some impervious mixture are the only preventives yet suggested which promise success. "Manufactured and thoroughly dried cement pipe may perhaps be coated with a material which would give satisfaction, but would not answer for a pipe made in the trench. The only coating which will give permanent satisfaction is one which will be effective upon a damp structure, and will incorporate itself so thoroughly with the cement that peeling or scaling off is impossible. It is hoped that such a material will

soon be found. A lining composed of vitrified tile plates has been proposed for the purpose in the West, and, thus far, barring the expense, it appears to have given satisfaction." An acid liquid, as in the case of the sewage sometimes discharged from factories, is known to disintegrate cement pipe. The preventive, as in the case of alkali, is to exclude the objectionable element if possible, or to give the cement a protective coating or lining.

"The effect of the gases produce an entirely different condition. The most serious of these is that of the sulphuretted hydrogen which may be converted into sulphuric acid in the sewer above the water, and in some cases, as found in a Los Angeles sewer by the City Engineer, Homer Hamlin, M. Am. Soc. C. E., sulphur crystals adhere to the bricks of which the sewer was built.

"The Los Angeles sewage produced no deterioration of the cement below the water surface, the speaker finding it hard and sound. This condition differed radically from the effects of alkaline sewage where the deterioration was chiefly below the water surface. The escaping sulphuretted hydrogen was converted into sulphuric acid within a short distance of its escape from the sewage, as was distinctly discernible on the surface of the brickwork in the arch. This acid transformed the carbonate of lime in the cement joints into sulphate of lime, a soft friable gypsum, which gradually caused the complete destruction of the binding quality of the mortar.

"In this case, no doubt, a good forced ventilation might have prevented the formation of sulphuric acid, or the sewer might have been given a vitrified lining, or at some time it may be possible to apply a coating which will protect sewers from this sort of destruction. In Los Angeles, for other reasons, the sewer was abandoned for one built in another locality."

Dr. Hering referred to instances in Germany, similar to the experiences in Los Angeles, in which the sewer air upon analysis was found to contain 200 parts per million of sulphuretted hydrogen. Equal parts of sulphuretted hydrogen and air were passed through cotton, after which water was filtered through it and the presence of sulphuric acid in the water was demonstrated. This was believed to prove that sulphuric acid might be formed from sulphur deposited on the sewer arch by the sulphuretted hydrogen. In Prussia disintegration of a concrete sewer laid through peaty ground was attributed to iron pyrites, which formed 17 per cent of the peat; the iron pyrites contributing the sulphur from which the sulphuric acid was derived. Structures in Charlottenburg have been protected against injury from sulphuric acid and other organic acids in the soil by completely covering the concrete with three layers of asphalt paper.

Dr. Hering stated, in conclusion, that the data cited by him indicated the following inferences:

1.—When the immediate agent of destruction is carried by water, disintegration will be found below the permanent water surface. If such water is flowing inside of a structure, as in a sewer (acid or alkali factory waste), the disintegration will be inside and as far as the water penetrates the material. If the water is ground-water in alkali soil, swamp or peat, the disintegration will be on the outside (Great Falls and Osnabruck), and chiefly between high and low ground-water levels, and may penetrate porous material toward the inside of the structure.

2.—When, on the other hand, the agent of destruction is caused by gases (generally sulphuretted hydrogen) arising from waters, whether on the outside (Osnabruck) or the inside (Los Angeles and Berlin) of a structure, the disintegration will take place above the permanent water surface.

Mr. F. E. Robertson, referring to conditions in India, stated that it is found in the alkali deserts there that the crystallization of the salts in porous material disintegrates it by an action somewhat similar to that of frost. Soft bricks and even underburnt fire clays are destroyed in this way, the only substance considered safe for use being brick which has been vitrified, at least on all external surfaces, and concrete with an impervious skin.

Mr. Richard Gaines, chemist of the New York Board of Water Supply, referred to the importance of the fact that it was not alkali as such, but rather sulphur to which was attributed the destructive action. He stated that the basic calcium aluminate in set cement is believed to be the vulnerable point of attack, the sulphates combining with this to form sul-

pho-aluminate of lime, a reaction attended with a great increase in volume and consequent disruption. Non-sulphuric alkalines also, however, both magnesium and calcium chlorides, are detrimental to concrete, owing to the fact that the chlorine radicals replace the aluminate, causing the production of soluble compounds. Experiments by Mr. Gaines, however, indicated that the sulphates were the most active decomposing agents.

Suggestion had been made in the discussion of the article that if the alumina in cements were replaced by ferric oxide much of the injurious action might be prevented, and this suggested the use of so-called iron-ore cement. Mr. Gaines, however, in testing this material found that while it was apparently unaffected by sulphate waters, it offered no greater resistance to the attack of calcium and magnesium chlorides than did ordinary Portland cement.

The principal significance of the above to the municipal engineer is in connection with sewers, although in sections of the country where the soil is alkaline, foundations and other concrete structures seem liable to deteriorate thereby. The fact that ordinary city sewage receives or is apt to receive either at the present or some future time greater or less quantities of both alkalines and acid waste waters is a matter which should not be overlooked. The formation of sulphuric acid from sulphuretted hydrogen gas is an additional danger, but one which should not exist in sewers properly designed and maintained, since this gas can ordinarily result only from putrefactive decomposition which would not take place in fresh sewage or in sewers where no deposits collect.

The proposition to line sewers with vitrified clay, whether in the form of bricks or of plates, would seem one deserving of serious consideration. It would seem as though this, however, would offer no advantage over the use of vitrified clay sewer pipes where the sewer is sufficiently small to permit the use of the latter, and the expense of lining a concrete sewer in this way would certainly be greater in most cases than the use of a pipe composed entirely of this material; and such a lined sewer would certainly be less safe against attack by acids than one of vitrified clay throughout.

#### ST. LOUIS TESTING LABORATORY

For a number of years the City of St. Louis has maintained a city testing laboratory, which was at first supported by the Street, Sewer and Water Departments through an approximate division between these of the pay-roll and cost of supplies; an engineer from the Water Department having supervision of the laboratory under the direction of the Water Commissioner. With the year 1908-1909, the laboratory was made a fiscal division of the Water Department, and \$15,000 was added to the appropriation for this department. This separate appropriation made possible constant engineering supervision, which had been found necessary because of the increased use of materials of construction by the city.

The cement testing room, which was originally devoted to the testing of water meters, contains a storage tank with a capacity of 4200 briquettes constructed of water-proofed cement mortar. A gas-burning water heater has been connected to this tank, which maintains a constant temperature of 70 degrees in the water supplied. Three moist closets have been constructed of the same material as the tank.

Continued practice in testing of cement has given increased accuracy. The effect of such experience is indicated by the fact that in April, 1907, tests on neat seven-day briquettes from given samples showed a variation of 17.2 per cent; 9.1 per cent in April, 1908, and 8.6 per cent in April, 1909. It is believed that further improvement in this respect can be secured only by improvements in the testing machines. During the past year a motor-driven cement sieve agitator has been added to the equipment, and six 3-gang, 2-inch cube molds have been procured and tests on the compressive strength of cement mortars have been made regularly.

An idea of the importance of cement testing is given by a statement of the quantities of cement used by the city. During the year 1908-1909, the several city departments used 656,-

421 sacks of cement; 3.1 per cent being used by the Water Department, 8.3 by the Sewer Department, 83.1 by the Street Department and the remainder on other city work. In testing this, 8799 briquettes were made from 558 samples. During the year considerable trouble was met with in the cement offered and about 7000 barrels failing to meet the city requirements were condemned.

A new brick rattle was used last year in testing brick and 212 tests were made. Tests were also made on 40 steel bars, 6 bronze bars and a few other miscellaneous tests.

#### TRACTION ON PAVEMENTS

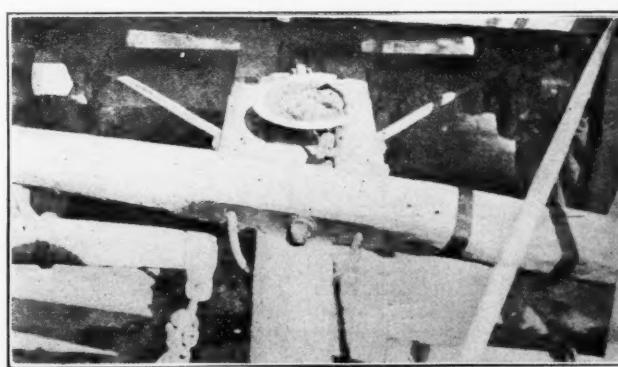
##### Dynamometer Tests of Tractive Resistance of Various Pavements, Both Wet and Dry—Brick, Wood, Granite, Asphalt and Bitulithic

THE universal demand in regard to pavements, which has become more and more emphatic during the past few years, has been for smoothness. To the ordinary citizen the chief advantages of this are absence of noise and greater comfort in riding. But smoothness is not so important on residence streets, where the vehicles are largely those for pleasure or light delivery wagons, as on the streets where the heaviest hauling is done. In spite of this, however, the smoothest pavements are now being laid on the former class of streets and heavy hauling is still being done over rough granite and cobble pavements. The indications are, however, that this is to be remedied and that before long a smooth stone block pavement, approximating that obtained in a number of cities with sandstone blocks, will be demanded and obtained in the case of granite block pavements.

It is therefore important to collect the information available concerning the relative traction resistances offered by the various classes of pavement. An interesting and valuable addition to this subject is the information obtained by experiments conducted in Toronto, Ont., by the Bridge Department of the city. The particular reason for this department undertaking these tests was their desire to learn to what extent it was necessary or desirable to reduce the grades on the approaches to bridges and on streets where grade crossings are eliminated. These experiments were conducted by Mr. A. C. D. Blanchard, assistant engineer in charge of special surveys.

The experiments were made in May and on pavements of old style cedar blocks, treated wood blocks, granite blocks, asphalt, bituminous, and brick, and were made in both wet and dry weather on most of the pavements. On asphalt, however, the experiments were not continued at any length on the dry pavements, since it was found that the results were affected very largely by the time of day, the resistance increasing considerably with the heat of the atmosphere as the sun rose to the zenith. In cloudy weather and with wet pavements, however, uniform and comparable results were obtained.

The results obtained were plotted on cross-section paper and curves passed through these, and formulas obtained fitting the same. An inspection of the notes and plotted curves, and



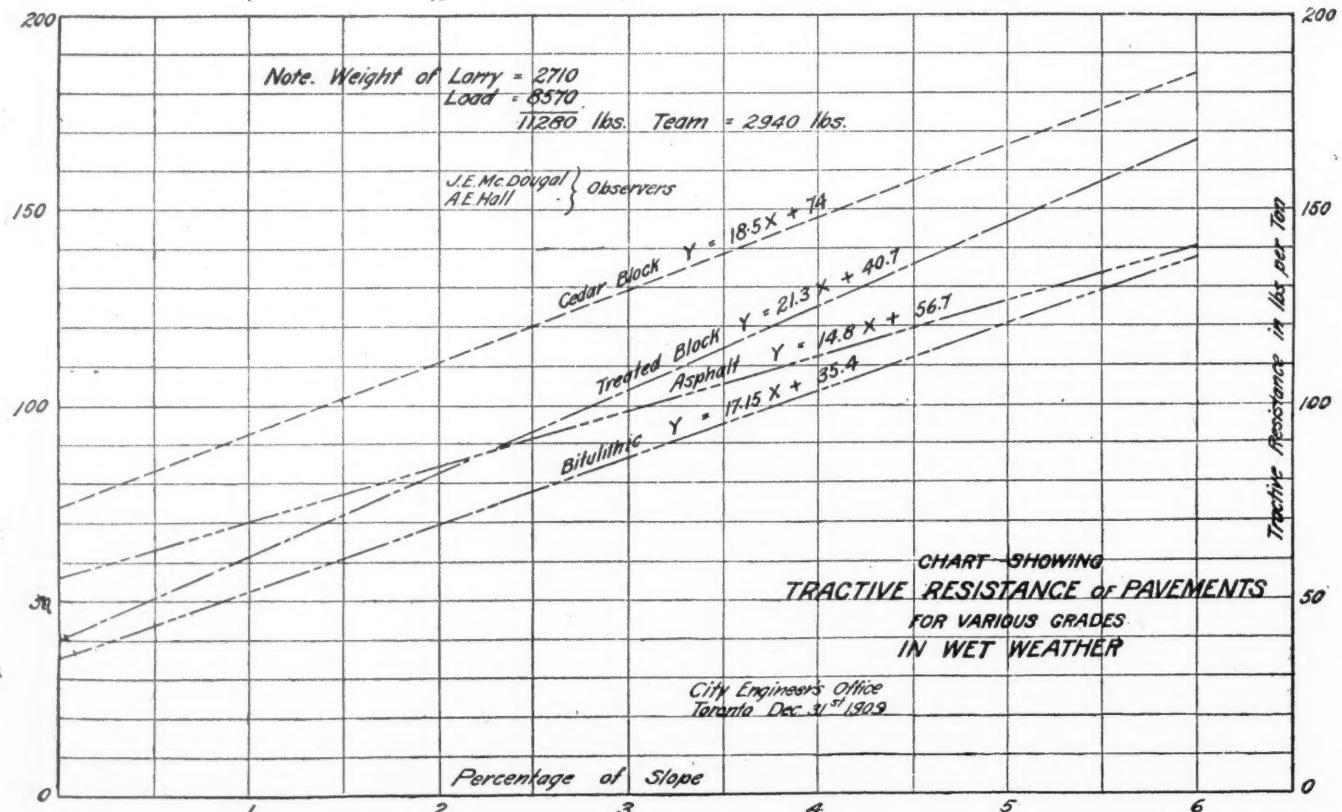
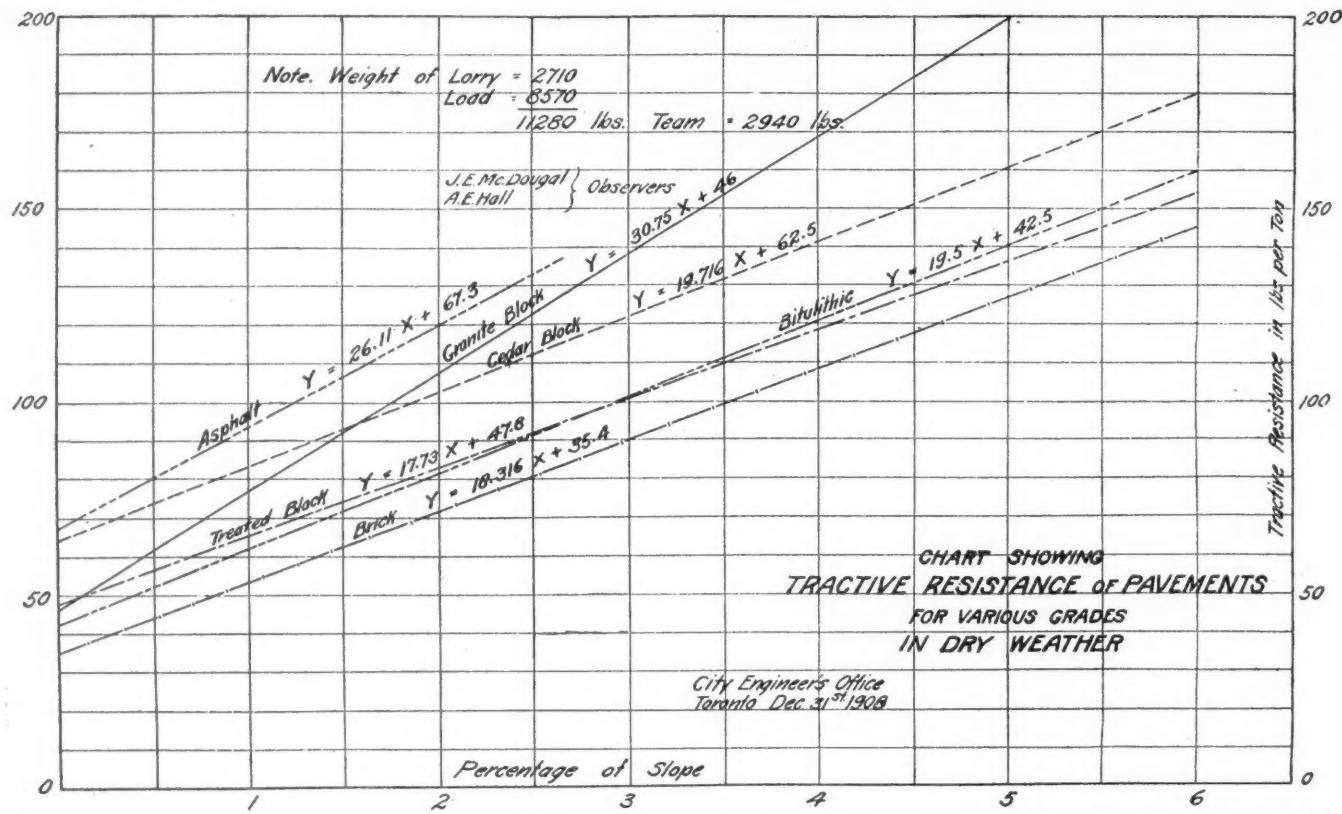
TOP VIEW OF DYNAMOMETER, TORONTO TRACTION TESTS

especially of the formulas developed, show that the "curves" are straight lines. It also appears that these lines are approximately parallel—that is, that the relations between grade and traction were practically the same on all pavements except granite block, but that on this the traction increased much more rapidly as the grade increased. As stated before, the results on asphalt in warm weather could not be combined into a formula which was not also a function of the temperature.

The pavement offering the least resistance on each grade was found to be the brick pavement. Treated wood block and bitulithic almost coincided for second place. Next came cedar block, and following this asphalt in dry weather. Granite

block, on a perfectly flat street, tied with treated wood block and bitulithic for second place, but rapidly rose to fifth place when the grade exceeded  $1\frac{1}{2}$  per cent. In wet weather bitulithic showed almost exactly the same traction as brick in dry weather (no records were obtained for brick in wet weather). Treated wood block held second place up to about  $2\frac{1}{2}$  per cent grade, above which asphalt occupied second place and treated block third.

All experiments were taken with a good steady team of horses harnessed to a lorry which carried a weight of  $4\frac{1}{4}$  tons. The dynamometer used was the standard form manufactured by the Canadian Fairbanks Company, and the greatest load indicated



## RESULTS OF TRACTION TESTS ON TORONTO PAVEMENTS

Treated Wood Block Pavement  
Load, 4½ tons. Lorrie, 2,710 lbs. Team, 2,940 lbs.

Street	Distance	Grade	WET		DRY		Remarks
			Starting Pull	Average Pull	Starting Pull	Average Pull	
Nelson.....	John to Simcoe.....	None	1,000	250	1,200	240	Good condition.
Court.....	Church to Toronto.....	.18	900	225	1,100	290	" " sticky when dry.
Wellington.....	Yonge to Bay.....	.44	1,000	266	1,200	325	" "
York Street Bridge:							
North Approach.....	350 ft. south from Front.....	4.6	1,200	800	1,200	725	Fair condition, greasy when wet.
Southwest Approach.....	100 ft. from east end.....	5.0	1,200	800	1,200	800	Good condition.
Simcoe.....	Station to Front.....	5.1	1,400	800	1,200	690	" "

## Cedar Block Pavement

Load, 4½ tons. Lorrie, 2,710 lbs. Team, 2,940 lbs.

Logan Avenue.....	300 ft. s. of Queen.....	.58	WET		DRY		Remarks
			Starting Pull	Average Pull	Starting Pull	Average Pull	
300 ft. s. to 800 ft. s. Queen.....	1.06				1,200	420	Good condition.
800 ft. s. to 1,100 ft. s. Queen.....	.57					475	" "
1,100 ft. s. to 1,700 ft. s. Queen.....	.25					400	" "
1,700 ft. s. to 2,100 ft. s. Queen.....	.62					350	" "
Gerrard Street.....	Bridge to River St.					415	" "
140 ft. to 240 ft. west.....	1.36				1,500	500	" "
240 ft. to 340 ft. west.....	2.44					650	" "
340 ft. to 440 ft. west.....	3.21					675	" "
440 ft. to 550 ft. west.....	3.78					750	" "
550 ft. to River.....	3.8					800	" "
Church Street.....	100 ft. from Esplanade.....	.65	1,100	500	1,400	400	" "
100 ft. to 200 ft. north.....	1.85		600			500	" "
200 ft. to 300 ft. north.....	4.3		850			800	" "
300 ft. to Front Street.....	6.0		1,050			1,000	" "

## Granite Block Pavement

Esplanade Street.....	500 ft. w. Berkeley.....	1	WET		DRY		Remarks
			Starting Pull	Average Pull	Starting Pull	Average Pull	
500 ft. to 1,000 ft. w.....	1				1,200	280	Good condition.
1,000 ft. to 1,500 ft. w.....	1					270	" "
1,500 ft. to 2,000 ft. w.....	25					210	" "
2,000 ft. to 2,500 ft. w.....	25					260	" "
2,500 ft. to 3,000 ft. w.....	25					240	" "
3,000 ft. to Scott St.....	25					210	" "
Lane 1st east Simcoe off Wellington.....	200 ft.....	1.3	900	425		225	" "
Yonge Street (Esplanade to Front).....	100 ft. n from Esplanade.....	2.4			1,100	750	Very rough.
100 ft. n. to 200 ft. n.....	5.0				1,200	950	" "
200 ft. n. to 300 ft. n.....	4.4					1,000	" "

## Brick Pavement

Load, 4½ tons. Lorrie, 2,710 lbs. Team, 2,940 lbs.

Dundas (Queen to Arthur).....	400 ft. n. Queen.....	1.06	WET		DRY		Remarks
			No results recorded on this pavement in wet weather.	Starting Pull	Average Pull	Starting Pull	
400 ft. n. to 800 ft. n. Queen.....	.87			1,000	290	" "	Good condition.
800 ft. n. to 900 ft. n. Queen.....	1.25				300	" "	" "
900 ft. n. to 1,000 ft. n. Queen.....	1.09				350	" "	" "
1,000 ft. n. to 1,100 ft. n. Queen.....	2.41				300	" "	" "
1,100 ft. n. to 1,400 ft. n. Queen.....	2.60				350	" "	" "
1,400 ft. n. to 1,600 ft. n. Queen.....	2.75				400	" "	" "
1,600 ft. n. to 1,900 ft. n. Queen.....	2.16				475	" "	" "
Queen St. Subway (West Grade).....	200 ft. east of Dufferin.....	None		900	200	" "	Good condition.
100 ft. west of Dufferin.....	4.58				700	" "	" "
100 ft. w. to 200 ft. w. Dufferin.....	4.2				700	" "	" "
200 ft. w. to 300 ft. w. Dufferin.....	3.95				700	" "	" "
300 ft. w. to 400 ft. w. Dufferin.....	1.85				450	" "	" "
Close Avenue (Springhurst to King).....	400 ft. n. Springhurst.....	3.35		900	520	" "	" "
400 ft. n. to 600 ft. n.....	2.25				450	" "	" "
600 ft. n. to 800 ft. n.....	2.0				400	" "	" "
800 ft. n. to 900 ft. n.....	1.3				300	" "	" "
900 ft. n. to 1,200 ft. n.....	.9				275	" "	" "

## Bitulithic Pavement

Load, 4½ tons. Lorrie, 2,710 lbs. Team, 2,940 lbs.

Bain Avenue.....	200 ft. w. Carlaw.....	1.09	WET		DRY		Remarks
			Starting Pull	Average Pull	Starting Pull	Average Pull	
200 ft. w. Pape to 300 ft. west.....	1.5				1,200	370	Good condition.
100 ft. w. Pape to 200 ft. west.....	3.0					400	" "
100 ft. w. Pape.....	4.0					575	" "
Park Road.....	100 ft. from Bloor. n. Bloor.....	.73	1,200	275			" "
100 ft. n. to 200 ft. n. Bloor.....	.2			200			" "
200 ft. n. to Bismark.....	.3			250			" "
Collier Street.....	100 ft. w. from Park Road.....	3.4	1,400	575			" "
100 ft. w. to 200 ft. west.....	3.1			450			" "
200 ft. w. to 300 ft. west.....	.73			375			" "
300 ft. w. to 500 ft. west.....	1.32			300			" "
500 ft. w. to 550 ft. west.....	.16			200			" "

## Asphalt Pavement

Load, 4½ tons. Lorrie, 2,710 lbs. Team, 2,940 lbs.

Yonge Street.....	Cumberland to Yorkville.....	.2	WET		DRY		Remarks
			Starting Pull	Average Pull	Starting Pull	Average Pull	
Agnes to Edward.....	.37	1,300	325	1,400	400	520	Badly worn. Good condition.
Edward to Elm.....	.75	1,400	360	1,500	600	480	Poor condition.
Davenport to Collier.....	1.00	1,400	425	1,400	760	650	Good condition.
180 ft. n. of Severn.....	2.60	1,400	500	1,400	760	650	" "
McGill to Carlton.....	2.47	1,200	530	1,500	760	650	Good condition.
Carlton to Wood.....	2.65	1,400	540	1,450	760	650	" "
100 ft. e. Broadview.....	4.0			1,500	650	500	" "
Logan Avenue to Howland.....	1.6			1,400	500	500	" "

by the dynamometer during steady pull was about 1,050 pounds. The starting pull, however, rose in some cases to between 1,200 to 1,500 pounds.

During wet weather when pavements having fairly steep grades were at all slippery the horses had some difficulty in keeping their feet under the load. This was noticed most particularly on the treated block pavement of York Street Bridge. The accompanying diagrams summarize the experiments for each class of pavement. The data from which the curves are plotted are given in the tables.

The formulas which are shown on the diagrams are given together below for greater clearness and to facilitate comparison. In these Y is the tractive effort required in pounds and X is the per cent of gradient for which it is desired to ascertain the tractive effort.

#### For Dry Weather—

For brick pavement.....	$Y = 200 + 103.3 X$
For treated block.....	$Y = 270 + 100 X$
For bitulithic.....	$Y = 240 + 110 X$
For cedar block.....	$Y = 350 + 111.6 X$
For granite block.....	$Y = 260 + 174 X$

#### For Wet Weather—

For treated block.....	$Y = 230 + 120 X$
For bitulithic.....	$Y = 200 + 96 X$
For cedar block.....	$Y = 420 + 103.3 X$
For asphalt.....	$Y = 320 + 80 X$

It is, of course, necessary in dealing with the various classes of pavement to take into consideration the provision of an adequate foothold for horses, and on this account it is worthy of notice that in connection with granite block pavement, while the tractive effort is higher than on other pavements, the foothold afforded is possibly much better.

### TRENTON'S REFUSE DISPOSAL

THE garbage crematory of Trenton, N. J., although nine years old and hence not containing the latest improvements, of which the last few years have seen many in this branch of waste disposal, has been carefully maintained, the advice of experts having been obtained as to the best methods of operating it, and is apparently giving better satisfaction than the average of such plants. In the report for the year ending Feb. 28th the Superintendent, Walter Firth, renews his urgent recommendation, which was first made two or three years ago, that another crematory be erected, as the capacity of the present one has been outgrown. The present crematory is being worked to its limit, and the consequences of a break down or of considerable increase in the amount of garbage to be handled would place the city in a serious position.

During the past fiscal year, beginning with March, 1909, the amounts of garbage disposed of, in tons per month, have been as follows: 816, 812, 984, 1,166, 1,147, 1,369, 1,387, 1,310, 1,086, 903, 818 and 636; a total for the year of 12,433 tons, or an average of 34 tons a day. In this is seen the gradual increase of garbage which culminated in September with 1,387 tons, or 46 tons per day, and then declined to a minimum in February.

In addition to this the department collected and disposed of 32,500 tons of ashes. In disposing of the ashes the difficulty was found which is experienced by most cities which dump their ashes on vacant land, in that, with the building up of the city, the possible locations for ash dumps become less and further removed from the centers of maximum collection, thus adding greatly to the expense of hauling.

Waste fuel from the engine rooms of the factories is separated at the crematory and employed to start the fires or added to raise their temperature. This reduces the amount of coal which would otherwise be necessary. The expense for fuel in 1909 was \$1,332.19, a reduction of about \$175 from 1908.

The expenditures of the plant for the year totaled \$28,774.69, which includes \$1,886.62 for repairs to the plant and \$13,187.60 for labor. Excluding the repairs, and combining the garbage and ashes, the average cost per ton of collecting and disposing of both of these was 64 cents per ton.

Other expenses were: Hay, \$1,869.89; straw, \$131.88; feed, \$3,602.60; shoeing, \$2,064.53; harness and wagons and repairing same, \$2,505.38.

### ADDITIONAL PAVEMENT DATA

SINCE publishing the tables of statistics concerning street paving on March 2d, we have received additional data which are presented in the table below. Through a typographical error it was stated in the table on page 328, that there are 132.3 miles of asphalt block pavement in Niagara Falls, N. Y., whereas this figure should have been credited to New York City, N. Y. There were a number of erroneous figures among those taken from the Census Bureau's statistics. This we discuss editorially elsewhere.

#### ADDITIONAL PAVEMENT STATISTICS

KIND OF PAVEMENT	TOTAL PAVEMENT			
	ON JAN. 1, 1910		LAID IN 1909	
	Miles	Sq. Yds.	Miles	Sq. Yds.
WORCESTER, MASS.:				
Cobble stone.....		447		
Stone block.....		217,865		33,776
Brick.....		11,535		1,075
Wood block, creosoted.....		531		
Sheet asphalt.....		4,878		
Asphaltina.....		7,820		
Bituminous macadam.....		23,659		21,319
Macadam.....		956,940		7,751
Gravel.....		507,282		42,830
Hassam.....		18,506		3,437
Treatment with dust layers.....				194,657
PIQUA, O.:				
Brick.....		14,641		
Wood block, creosoted.....		400		
Bituminous macadam.....				15,863
YOUNGSTOWN, O.:				
Stone block.....		16,227		2,559
Brick.....		478,408		136,905
Asphalt.....		210,322		6,404
Bitulithic.....		107,028		5,190
BAY CITY, MICH.:				
Brick.....	18.33			
Sheet asphalt.....	7.11			
Cedar block.....	8.00			
Bituminous macadam.....	0.33			
SOUTH OMAHA, NEB.:				
Vitrified block.....		156,271		
Stone block.....		56,709		
Asphalt.....		5,934		
Concrete.....		1,071		
ST. JOSEPH, MO.:				
Stone block.....	0.80		0.20	
Brick.....	29.60		2.50	
Wood block, creosoted.....	0.10		0.10	
Asphalt.....	9.28		0.28	
Mineral rubber.....	.30		.30	
Asphalt macadam.....	.20		.20	
Macadam.....	28.60		1.50	
Hassam.....	3.60		2.80	
Treatment with dust layers or surface binders (old macadam).....	6.00		4.00	
Alleys (mostly brick).....	5.60		.50	
SAN JOSE, CAL.:				
Asphalt.....		35,788		35,788
"Bitumen".....		161,868		18,316
Macadam and gravel.....	64.82		1.64	
Asphaltic concrete.....		14,150		14,150
ROME, N. Y.:				
Brick.....	3.25			
Asphalt.....	5.25			
Bitulithic.....	2.0			
DAVENPORT, Ia.:				
Brick.....	46.64		3.6	
Wood block, creosoted.....	0.03			
Asphalt.....	12.02		2.4	
Concrete.....			0.18	
Macadam.....	0.73			
Treatment with dust layer.....			0.17	
OMAHA, NEBR.:				
Cobble stone.....	24.76		0.05	
Brick.....	37.69		5.43	
Wood block.....	3.6			
Asphalt.....	51.56		2.96	
Macadam.....	4.69			
Treatment with dust layers.....	.59		0.38	
BALTIMORE, MD.:				
Cobble stone.....	359.78	4,924,797		
Belgian Block.....	49.46	1,018,987		64,329
Sheet asphalt.....	14.18	346,282		91,332
Asphalt Block.....	16.88	404,872		
Vitrified block.....	12.75	226,238		47,780
Mosaic Block.....	1.80	25,770		
Wood block, creosoted.....	1.67	33,592		
Macadam, ordinary.....	52.21	645,075		
"tar and asphalt".....	1.48	26,599		17,047
Bitulithic.....	9.09	240,224		73,615
Medina block.....		1,517		
Unpaved.....	31.95	420,329		
Totals.....	551.25	8,314,282		

## JOINT SEWAGE DISPOSAL

### Drainage Areas as Units of Sewerage—Combination of Communities for Sewage Disposal—Modern Disposal Methods—When Dilution Is Permissible

From an address before the Associated Boards of Health of Bergen County, N. J.

By the Editor of MUNICIPAL JOURNAL AND ENGINEER

THE matter of sewerage is, in a very important respect, a peculiar one; in that its operation must rely very largely upon the action of gravity, and that therefore the topography which creates natural drainage areas almost unavoidably determines the principal features of a sewerage system. The matter of designing sewerage systems for communities would be very much simplified to the engineer if political subdivisions could be entirely neglected and design be regulated by those set up by nature. Moreover the cost of the systems could in many cases be reduced were these political boundaries entirely neglected. This, of course, would necessitate, under our present organization of communities, the combination of several independent communities, or of sections of each, for the construction and operation of joint sewerage systems. Such combination would frequently permit not only of a reduced cost of construction of the sewers themselves, but in addition, when some disposal of the sewage other than discharge into the nearest water course is necessary, a combination in a joint outlet or joint sewage disposal plant would permit a still further saving. Such savings are not possible in every case, as there may be numerous situations in which the several settlements are so far separated by unoccupied land that the cost of uniting these by sewers would more than balance the saving effected in other ways. It is not therefore to be taken for granted that the combination of small communities for purposes of sewerage is always desirable, but such combinations could be made much more frequently than they are.

Twenty years ago the speaker was engaged as engineer on what was probably the first combination of New Jersey communities in a joint sewerage scheme. This was the joint construction by the City of Orange and the towns of Bloomfield and Montclair of an outlet sewer discharging into the Passaic River. This was the forerunner of several such combinations in the State, the largest of which yet accomplished is the joint outlet sewer which receives sewage from seven distinct municipalities in two counties and discharges the same at the head of Newark Bay. This sewer was built jointly by the municipalities of Newark, Summit, South Orange, West Orange, Irvington, Millburn, and Vailsburg; the drainage area so served including about 66 square miles and containing a present population of something over 50,000. A still larger scheme, familiar to you all, is that for receiving in a joint sewer the drainage which now reaches the Passaic River from Paterson to New York Bay. The area involved in this contains over 76 square miles and comprises the whole or part of 20 distant municipalities in four different counties with a population of about 600,000. A proposition for joint discharge at tide water or joint purification has been considered by the City of Plainfield and four or five neighboring towns having a total population of 35,000 to 40,000.

Passing to other States, we find the largest joint scheme in the country in the Metropolitan Sewerage District of Boston, which was formed in 1889 to prevent the pollution of the streams discharging into Boston Harbor. The total area embraced in this sewerage district is about 191 square miles, comprising 25 distinct municipalities—Boston and its suburbs—with a total population of nearly 1,000,000.

In New York we find the Bronx Valley trunk sewer, now almost completed, which will receive the sewage from the whole or part of six cities and towns in West Chester county, the area drained being about 34 square miles and the present population about 30,000. In Alabama the whole of Jefferson County, a considerable part of the population of which is in the City of Birmingham, has been formed into a sewer dis-

trict and 13 distinct cities and towns are drained by a system of sewers and the sewage treated by septic tanks. There are a number of other instances where two or three communities have combined, especially where a city takes care of the sewage of the whole or a part of a suburb whose drainage naturally flows toward that city.

It is therefore apparent that the idea of co-operation in the collection of sewage and discharge of the same at a common outlet is not new; but in few if any of these instances, with the exception of Birmingham, has there been included a treatment of the sewage so collected. With the rapid increase in the number of sewage treatment plants, however, it seems very probable that joint treatment works will soon be found in various parts of the country. In fact, it seems that treatment of some kind will be required of the Passaic Valley sewage before discharging it into New York Harbor.

These considerations naturally lead to the question of the advisability of small communities, such as those found in such numbers in Bergen county, combining for the treatment of sewage, and the methods of treatment best adapted to this purpose.

Sewage is dirty water, neither more nor less. The amount of pollution contained seldom exceeds one part to each one thousand parts of water; and if the sewage has flowed for any considerable distance through a sewer system, considerably less than one-half of this is in the form of suspended matter, the remainder having been taken into solution. Of this matter the most part is organic, containing a small percentage of nitrogen, a considerable amount of fat, and carbonaceous matters in various combinations. These carbonaceous matters do not putrefy rapidly and therefore are of comparatively small importance so far as creating a nuisance is concerned; except the grease and fats, which will not combine with the water but are apt to collect along the shores and give them an unsightly appearance. We, therefore, see that a very minute percentage of sewage is really objectionable.

There are, however, matters in sewage of much greater importance—bacteria, found by the millions in all sewage, and some of which may at any time, without warning, be pathogenic. The organic matter will, under certain conditions, produce offences to sight and smell. There is really little danger of its actually causing sickness, since the amounts of this which it would be necessary to take with drinking water in order to directly produce disease would not be likely to be tolerated by any community, as the comparatively gross senses of taste and sight would be sufficient to set them against it.

The real *danger* in the sewage lies in the disease germs. Whether the water of a stream is or is not used for a public water supply, more or less of it will undoubtedly find its way onto articles of food, into the mouths of bathers, and in other ways be a constant menace. Every foot added to the distance between a typhoid patient and the ocean increases the difficulty of destroying these dangerous germs. Could every physician, nurse and other attendant on such an invalid be relied upon to do his or her duty, these germs would be destroyed before ever reaching the sewer. As health officers, it is your duty to bring about this destruction so far as possible, and I have no doubt that this duty is performed as thoroughly as is practicable. Until human nature is changed, however, complete reliance cannot be placed upon the exclusion of such germs from the sewers. The next point at which they can be attacked is in the sewers themselves, or at least before the sewage is diluted with a much larger volume of water; and it is here, at the sewer outlet, that the next effort is made to prevent the spread of this contagious matter.

We, therefore, have sewage treatment divided into two general aims—the prevention of nuisances by the organic matter, and the prevention of the spread of disease by pathogenic bacteria. Ten years ago it was generally assumed that the aim of sewage treatment was the actual removal of practically all the organic matter from sewage and of the bacteria contained therein. This meant not only the removal of suspended matter, but the oxidation of organic matters in solution; and the aim was to, so far as possible, cause a transference of the suspended

organic matter into soluble matter that all might be oxidized. The Massachusetts State Board of Health did world-famous work in studying this phase of the subject, and developed to its limit the theory of bacterial oxidation of organic sewage matter. They found, what has not been disproved, that the only practical method for effecting this was by intermittent filtration through sand.

Without discussing the various steps by which ideas on this matter have changed in the last decade, we may summarize the present idea of authorities on this subject as follows: Our rivers cannot by any practicable means be maintained as pure mountain streams. They must, in the nature of things, contain more or less suspended matter of all kinds; and even if no sewage were discharged into them they would still be far from pure, and unsuited for public water supplies. It is, therefore, asking too much of communities to expect them to discharge into streams from their sewers, a liquid which is approximately suitable for drinking water.

Nature has provided means for oxidation of organic matter in water as well as in soil. Water, unless grossly polluted, contains considerable amounts of free oxygen, and if this water be intimately mixed with sewage the organic matters in this will oxidize just as surely, though not so rapidly, as though passed through a sand filter. It is, therefore, a legitimate method of sewage disposal to mix it thoroughly with considerable volumes of water which contains more or less free oxygen, with the knowledge that a gradual oxidation or so-called destruction of the organic matter will take place. There must be borne in mind, however, that a given stream contains only fixed amounts of oxygen. So long as it receives no more organic matter than can be oxidized by this amount, and so long as thorough commingling is obtained in order that all the oxygen may become effective, no nuisance will be created. If, however, either of these conditions do not obtain—if too much sewage be discharged at one point so that there cannot be rapid and thorough intermingling, or if the total amount of sewage be greater than can be oxidized by the free oxygen of the receiving stream—then a nuisance is bound to follow. The former condition is more frequent than the latter; the Passaic river being possibly the only large body of water in this vicinity which receives more sewage than it can assimilate after thorough intermingling. There are, however, numerous instances of local nuisances caused by the discharge of sewage in such large quantities and with such slow intermingling that putrefaction begins before oxidation has taken place. Also the depositing of suspended matter along shores and on vegetation or structures standing in the water are causes of objectionable conditions. New York Bay now receives directly or indirectly the sewage from probably six or seven million population. It has been calculated that it could, with thorough intermingling, receive without nuisance the sewage from approximately fifty million. Investigations recently made by a commission have found that there is no difficulty in the assimilation of the sewage which it now receives and that the only nuisances occasioned are at the mouths of sewers where these are improperly located or where too great discharge has been concentrated at one point.

This means that the cheapest of all methods of disposing of organic sewage matter—dilution or discharge into flowing streams or large bodies of water—has not yet been given the thorough study and development its importance warrants.

Particular attention is called to the fact that the above remarks, which if accepted might seem to open the doors to a free discharge of sewage into our streams, referred to organic matter only, and should not be taken to imply that the millions of bacteria in crude sewage should be set free to carry their contagion where they will. They should be destroyed as thoroughly and completely as possible; and since we cannot with our present knowledge segregate the pathogenic from the non-pathogenic, it seems necessary to destroy them all. Only within the last few years has it been realized that this is prac-

ticable; but experiments, not only in the laboratory but also in actual practice, conducted in Ohio, Maryland and New Jersey, have proved that it is possible at reasonable expense to destroy 98 to 99 per cent of all the bacteria in sewage.

The plant for performing this sterilization, or rather disinfection, involves very little expense, and such treatment can be done almost as cheaply in small plants as in large. It is also seen that for disposal by dilution, or discharge into bodies of water, the greater and more rapid the intermingling the better and surer the results; and such intermingling is secured better by a multiplicity of outlets than by concentration in a few. If, therefore, a town or other community is situated convenient to a stream which is capable of receiving and oxidizing its sewage there would seem to be no advantage, and in fact a disadvantage, in combining with other communities for its disposal.

If the only accessible stream, however, cannot safely receive the entire pollution of the sewage there remains the alternative of carrying this to a larger stream at a greater distance, or of so treating the sewage that the nearby stream can safely be relied upon to complete the purification. In the former case, combination with other neighboring communities whose conditions are the same may be financially advantageous.

Whether it would be better to carry the sewage to a distant outlet, or to so modify it that it can be discharged into the nearby stream, should receive the most careful consideration; as should also the question whether or not it will be advisable for several communities to combine in treating the sewage. It may be said in general that the more recent methods of treating sewage, while they have greatly reduced the area necessary and to some extent the first cost, require fully as much attention and intelligent direction, if not more, than did the irrigation or sand filtration methods of a decade ago; and the cost of this to each community would be reduced by combination.

These latest methods have in view as their aim not the purification of sewage, but the modification of its organic contents to such a physical and chemical condition that it will not putrefy rapidly but will allow considerable time for thorough intermingling and oxidation. They also remove perhaps 25 to 50 per cent of the organic matter and hold this back for further treatment in concentrated form, the matter so held back being to a large extent that which is most putrescible; a portion of this being eliminated from the problem by being transferred into gases which escape into the atmosphere. This modification of organic matter is effected by contact filters and by sprinkling filters.

The action of these is not purification in the sense formerly understood, but is rather a modification. Instead of removing or destroying by oxidation 99 per cent of the organic matter, it passes on approximately 50 per cent to the stream, but in a much less objectionable form. Sewage thoroughly purified by a sand filter could be allowed to flow in a ditch without any dilution without creating a nuisance. This could hardly be said of the effluent from a sprinkling filter; but the dilution required is no where near as great as would be necessary for crude sewage. Consequently, such an effluent could be discharged into a small stream, where this alone is available, and thus obviate the necessity of a long and expensive outlet to a distant larger body of water.

The ideas above outlined would therefore apparently lead to the following conclusions: That all sewage, whether otherwise treated or untreated, should be disinfected to a high degree before discharging into any body of water. That much can be done by proper designing to render possible and unobjectionable the disposal of sewage by simply discharging it into streams or tidal waters. That where a water of sufficient volume is not accessible, discharge into a small stream may be rendered possible by a modern sewage modification plant. And that, finally, if there is no stream retaining any considerable volume throughout the year, the more complete purification by intermittent sand filtration is necessary.

# Municipal Journal and Engineer

Incorporated

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## SUBSCRIPTION RATES

United States and possessions, Mexico, Cuba.....\$3.00 per year  
All other countries.....4.00 per year  
Entered as second-class matter, January 3, 1906, at the Post Office  
at New York, N. Y., under the Act of Congress of March 3, 1879.

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APRIL 6, 1910.

## CONTENTS

Intercepting Sewer at Elizabeth, N. J. (Illustrated)	479
Roadway Widths and Street Lengths.....	483
Acids, Alkalies and Concrete Sewers.....	483
St. Louis Testing Laboratory.....	485
Traction on Pavements (Illustrated).....	485
Trenton's Refuse Disposal.....	488
Additional Pavement Data.....	488
Joint Sewage Disposal.....	489
Water Rate Changes.....	491
Sulphur In Soil Attacks Concrete.....	491
A Criticism of the Census Bureau.....	491
Widening Streets.....	492
Automatic Sewer Regulator (Illustrated).....	492
Water Meters in St. Paul.....	493
Publicity and Health Regulations.....	493
Water Meters in Fort Wayne.....	493
Street Ornamentation in Anderson (Illustrated).....	493
News of the Municipalities (Illustrated).....	494
Legal News—A Summary and Notes of Recent Decisions.....	501
News of the Societies.....	502
Personals.....	503
Trade Notes.....	503
Municipal Appliances (Illustrated).....	504
The Week's Contract News.....	506
Patent Claims (Illustrated).....	518
Incorporations .....	518

## Water Rate Changes

A NUMBER of changes in water rates which are being made by municipal plants in several cities would seem to indicate a desire to place such rates upon a more scientific basis than formerly. Some time ago we noted, for instance, that Columbus was raising its water rates because it had found the old ones to be too low to enable it to meet expenses from the income. In our March 30 issue it was stated that Topeka, Kan., on the other hand, had just reduced rates because it found those in force to be higher than was necessary to meet expenses. Probably these changes are due to a more careful analysis of the relation between revenue and total expense and an effort to adjust the rates to a business-like operation of the plant.

## Sulphur in Soil Attacks Concrete

THE danger to concrete sewers from the deteriorating effects of ground water has been generally assumed to be confined to strongly alkaline soils, but it appears from an article in this issue that sulphur in the form of iron pyrites has proved equally injurious; iron in this form being a considerable constituent of peaty soil. Sulphur may occur in other soils also, as in waste from coal mines used for filling low ground in the coal regions; and this would seem to be deserving of careful investigation where it is proposed to use concrete for sewers, wire conduits and other underground structures.

## A Criticism of the Census Bureau

THE Census Bureau is this year making unusual and commendable efforts to secure greater completeness and accuracy in the population statistics which its agents will in a few days begin collecting, by explaining beforehand, through the public press, the nature of the questions which will be asked. This shows a foresight and enterprise which we hope will be equaled in compiling the statistics thus obtained with accuracy and publishing them with promptness. Unfortunately, the conduct of the Bureau during the past few years does not seem to warrant very great confidence that such will be the case. Our specific reasons for making this statement are as follows:

Every two years the Bureau collects statistics of various kinds concerning cities, but they are not published until at least two years later. During the past month papers throughout the country have given space to interesting items concerning cities "according to the latest Census statistics." They did not say and probably did not know that, although these were "advance items" from a report not yet distributed, the facts given apply to the year 1907; but such is the case. Private enterprise and capital publish facts within 24 hours of their happening or discovery; the enterprise (?) and capital of a government bureau requires two or three years.

It may be argued in reply that there is a vast deal of difference between news and statistics. We admit this. We have reason to know it, for the MUNICIPAL JOURNAL AND ENGINEER collects and publishes both, and during the past two years has collected and published one-third as many statistics concerning cities as has the Census Bureau itself; although this has been as extra work, outside of the regular routine. And we speak advisedly when we say that the editor will guarantee, with the aid of two office assistants and two in the field, to collect, tabulate and publish all the data concerning cities published by the Census Bureau, and have the same in printed form ready for distribution in less than six months, and probably less than three, from the time of undertaking the task.

And they will be more accurate than the Census Reports, too. With two years in which to tabulate and digest the reports, there certainly can be no excuse for failure to discover most of the errors therein, at least the self-evident ones. But what are the facts? We recently had occasion to examine two sets of statistics published by the Bureau, one dealing with sewerage systems, the other with street pavements. Certain figures impressed us as improbable, and led us to examine them all critically. We did not go through the table with a fine-tooth comb for minor errors, but we found in these two tables questionable figures in the reports of 50 of the 158 cities covered; in most cases only one or two figures from a city. A letter addressed to these several cities has so far brought replies from 25 of them, and 22 of these confirmed the suspicion of the incorrectness of the figures, the remaining three explaining the unusual circumstances which caused the figures to present a suspicious appearance.

Only a few hours were spent in the examination of these tables and only such indications were looked for as were self-evident from the figures themselves. It is probable that a more careful analysis of the figures would have discovered more errors. Even a comparatively short experience in the collection of statistics should have suggested to the Bureau the necessity for careful scrutiny of all figures for errors, which are bound to slip in. Had the Bureau published these figures as soon as they could be obtained and compiled, say within the first two months of the following year, there might be an excuse for not subjecting them to this close analysis. But with the assistants and time which it has at its disposal we cannot conceive of any excuse for the official publication of these errors without the taking of ordinary precautions to detect and rectify them.

Why the Bureau is so dilatory and why it does not detect and rectify errors in the statistics we cannot say. Is it more than a coincidence that the two years consumed in compiling one set of statistics keeps the clerical force occupied just up

to the time when the next set must be taken hold of? Is it to avoid the necessity of discharging or finding other work for these clerks that the Bureau permits them to spend two years in doing three months' work?

As for the mistakes, some of them may be due to carelessness in the Bureau, some to failure of the responsible heads to recognize the importance of discovering and eliminating them; and a number are due to the indefinite form of some of the questions asked in obtaining the statistics, which has led to the replies being wrongly construed by the Bureau. As a single instance of this, the only classification of pavements made by the Bureau under which stone block of any kind could be placed is that of "Granite and Belgian Block," or else "Miscellaneous." There are in a number of cities scores of miles of excellent sandstone block and trap block pavements, and in answering the questions of the Census Bureau some have included these under "Granite and Belgian Block," others under "Miscellaneous." This is but one illustration, but we could cite at least a half-dozen other ambiguities in the questions asked.

Statistics of cities are of interest to a very considerable percentage of the citizens of this country. But our cities are growing and changing rapidly and information concerning them which is two or three years old before it is made public has lost a large part of its value and of its interest. We believe that the Bureau would be perfectly justified in spending double the money if by so doing it could place these statistics in the hands of the people within six months after the termination of the year to which they apply. But we do not believe that any additional expense would be necessary in order to do this. As to the elimination of errors, the cost of this would be little more than that involved in the employment of two or three experts in municipal finances and in public works engineering to spend a few days in revising the questions and critically inspecting the tabulated replies. So far as is known this has not been done; and if it has been done, then the experts so employed are certainly open to criticism.

#### WIDENING STREETS

IN many of our older cities the original streets were constructed with a width insufficient for present conditions of traffic and high modern buildings, and the necessity becomes more and more pressing with the growth of the city for increasing their width. But the value of the land and consequent cost of the improvement increase more or less uniformly with the necessity for greater width. It is therefore a problem with a number of cities how to widen and in many cases straighten the lines of some of their principal streets.

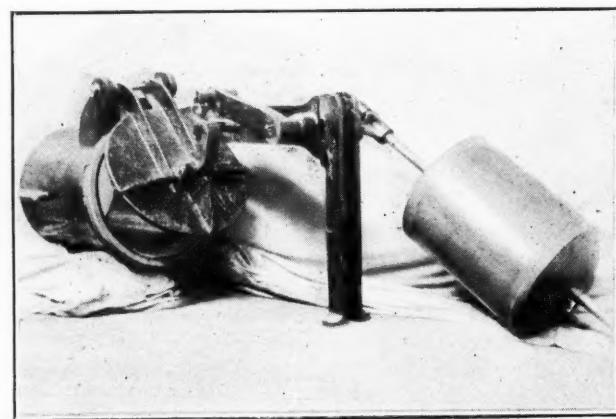
A civil engineer of New Haven, Conn., Mr. Chas. A. Ferry, has recently suggested a method for accomplishing this result in that city, which, while it is not novel, being practically the same plan which was adopted in Boston a number of years ago, may offer ideas to other cities who find themselves in the same dilemma.

The old streets of New Haven, or at least the main thoroughfares of the town, were established about 250 years ago with a width of 66 feet. Owing probably to carelessness, cupidity or ignorance of the necessity for carefully establishing the lines by accurate surveys, buildings have extended over the original street lines by greater or less amounts until the present lines are extremely irregular and the street width has been reduced by many feet. Mr. Ferry's suggestion is that the street be widened on the map, the new lines being accurately run and monumented. That then, in awarding damages to the property owners whose property is included within the new street lines, separate damages be awarded for the land and for the structures thereon. The city would then pay the land damages and become owners of the property, but allow the owners to retain possession of the property and leave the building upon the same by the payment of an annual rental which would be about 5 per cent upon the land damage awarded. If the building did not extend over the new street line of course no such arrange-

ment need be made, and if it were of small value it might be worth while to move it back at the expense of the city or even to rebuild the front, also at the expense of the city. Should a fire occur at any time in a projecting building, or any other accident whereby the front wall should be rendered unsafe or impossible for further use, the city could then refuse permission to rebuild the wall outside of the street line. Also, whenever any reconstructing of the building is undertaken in the future the city could require this to be entirely outside of the street lines. If all the structures on a block should finally have been moved back to the new line excepting one or two, these could then, if it seemed desirable, be moved back or reconstructed at the expense of the city. Under this method it might, of course, be years before the street was entirely widened and the line straightened; but so rapidly are the main streets or our large growing cities reconstructed that the time required would be less than is realized by most citizens. It would at least result in such re-alignment at some future time, which would never result unless some action be taken; and the expense of such action will in almost every case increase rather than decrease as time passes.

#### AUTOMATIC SEWER REGULATOR

THE reconstruction of old sewer systems or the combining of old sewers with new systems; the co-operation of several communities in the construction of a common outlet or intercepting sewer, as in the case of the Boston Metropolitan District; the discharge of sewage below the level of high tide, and a number of other conditions in modern sewerage call for construction or appliances which will permit the occasional diversion of sewage from its ordinary channel to an emergency channel or outlet. A single illustration of this is the use of tide gates which close during flood tide but open to allow the exit of the sewage during the ebb. Wooden gates have been used for this purpose, but they are subject to rapid decay and somewhat to an absorption of filth from the sewage.



SEWER REGULATOR ASSEMBLED AS IN SERVICE

In the Metropolitan system of Boston, devices of this character are placed at the connections of all local systems with the trunk sewers and several styles have been employed for this purpose. One of the latest is a regulator shown in the accompanying illustration. This is of cast iron, but a rubber valve seat is substituted for the more common rigid metal face, in order to insure water tightness. The gate is actuated by a float, being closed through the powerful leverage of a toggle joint. The joint is capable of easy adjustment so as to seat properly and produce the required amount of compression at the moment of closing. This appliance may be operated by the flow either in the trunk sewer or in the interceptor; the float in either case being located in a side chamber, which does not require a sump, but drains out when the sewer is empty. The use of this requires the construction of a side chamber at the junction, but otherwise the apparatus is complete for building into the masonry of the sewer.

### WATER METERS IN ST. PAUL

ST. PAUL, MINN., had in service on Jan. 1, 1910, 13,687 water meters, of which 1,552 had been set during the year. Of these, 1,242 had been repaired during the year and 1,050 old meters had been tested, in addition to which all of the new meters were tested before being set. The occasions for repairs were as follows: Stopped from accumulation of rust or mud, 186; broken or defective intermediate gears, 197; broken or defective dial gears, 384; injured by frost, 89; injured by hot water, 33; worn out, 144; discs broken or worn out, 51; pistons broken or worn out, 21; spindles worn or broken, 121; leaky stuffing boxes, 201; stopped from fish or shells, 10. It will be seen that a number of the above were really not repairs, but rather the removal of suspended matter which had accumulated from the water. The tightening of leaky stuffing boxes also might not be considered as being repair proper; but aside from these we have actual breakage of parts in 896 meters. Just how much the repairing and other maintenance items in connection with meters cost the department is not stated, but the labor on meters, probably including the setting of the 1,552 new meters, cost \$13,819.95, during the year. Fourteen years ago there were in use 1,546 meters and the number has increased at an average rate of 858 a year since then, the increase each year varying little from the average, except for a considerable increase in the numbers added during the past year or two.

### PUBLICITY AND HEALTH REGULATIONS

MUCH has been said in recent years concerning publicity as an assistance in obtaining from public service corporations just and equitable treatment of the public. The New York State Board of Health has recently made use of the same aid in enforcing action by a municipality. The village of Clayton, N. Y., suffered an epidemic of typhoid fever concerning which the local authorities and the local press said as little as possible because of the feared effect upon the visitors to the village, which is something of a summer resort. This was perhaps but natural; but the extent of the epidemic was not made known to the State Board of Health; and when their attention was called to it by private parties and they had pointed out to the village authorities the necessity for making certain changes, the authorities failed to take any adequate steps. The State Board thereupon addressed to the village trustees a letter rehearsing the recommendations of the Board and the reasons which had lead to it and pointing out the seriousness of the conditions which existed. This letter the State Board not only sent to the trustees, but also arranged that it should appear in a number of newspapers published in that section of the country. This method of stirring the village to some action will, it is expected, prove especially effective in this case, because of the income which the village derives from summer visitors and the tendency which a knowledge of the unsanitary water supply will have in keeping them away from the village.

The conditions which apparently caused this epidemic were such as may possibly exist elsewhere and it is worth while calling attention to them. The St. Lawrence river, from which the supply is drawn, receives the sewage from a number of municipalities, and the water taken from the river is distributed without any attempt at filtration or disinfection. Moreover, the water supply intake pipe and the outfall sewer are laid in the same trench, and the sewer discharges but a short distance from the intake, although at some distance from its mouth. It is suspected that the intake is not perfectly tight in all its joints, and as the sewer itself probably leaks (as most sewers do to a greater or less extent), and as, in addition, the sewage is discharged near the line of the intake, there is a possibility of its being sucked in through defective joints in the intake pipe. The pollution of water supplies, otherwise passable, by the entrance through defective joints of polluted water through which the intake is laid has been discovered in a number of instances; and wherever there is any possibility of this occurring the greatest pains should be taken to avoid it.

### WATER METERS IN FORT WAYNE

THE Meter Department of Fort Wayne, Ind., in its latest report stated that it had adopted a system of periodically examining the meters in use. Apparently this is more than ordinarily necessary in Fort Wayne, as the water used in that city appears to cause stoppages in the meters to an unusual degree. "We have discovered meters about 150 per cent slow, and over one-half of them that we have overhauled could be averaged at 20 per cent slow." The foreman of the department recommended that meters be read once a month in order that the failure of meters to register might be discovered and remedied as soon as possible. Apparently, as stated, systematic inspection of meters would fully pay for itself in that city by the increased income resulting. The total number of meters in service was 3,971. During the year 1,068 meters were repaired. In making these repairs there were used 30 different classes of articles, these including bolts, bushings, disks, dial pins, gear wheels, seals, etc.

### STREET ORNAMENTATION IN ANDERSON

A FEW weeks ago we called attention to the beautifying of a wide street by a strip of central parking which also served to conceal the trolley track. Also to the possibilities of using a triangular open space for ornamental shrubbery. Both are illustrated by South Main Street and the Plaza of Anderson, S. C., photographs of which are shown. The Plaza contains



PLAZA AND COURT HOUSE, ANDERSON

the Confederate monument and is faced by the Court House, the whole being covered with lawn, walks and low vegetation, which does not obstruct the view of the monument.

The trees in the parking, on the other hand, are sufficiently high to partly conceal the trolley poles as well as the cars, and to furnish some shade on the business street. The roadways around the Plaza and the main streets are paved with brick and stone blocks, there being 17,000 square yards of the former and 12,000 of the latter.



PARKWAY IN MAIN STREET, ANDERSON

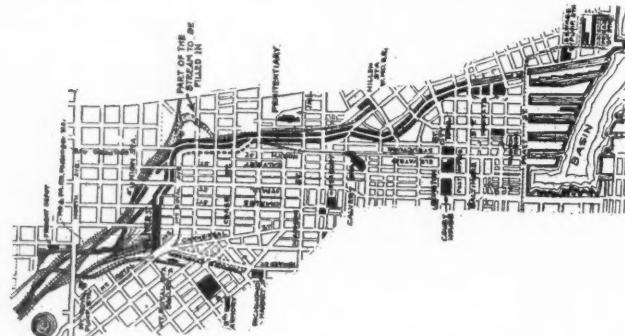
## NEWS OF THE MUNICIPALITIES

**Current Subjects of General Interest, Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance**

### ROADS AND PAVEMENTS

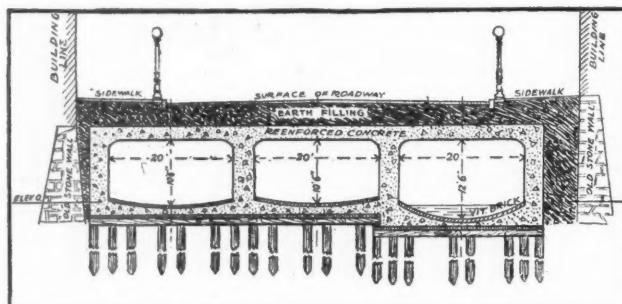
#### **Plans for Jones' Falls Boulevard Improvement**

Baltimore, Md.—The Committee of One Hundred, of which Francis K. Carey is head, has taken up the Jones' Falls Boulevard scheme, as proposed by Calvin W. Hendrick, Engineer of the Sewerage Commission, in 1906, and if the two bills it has before the Legislature go through there seems every possibility now that this much-discussed improvement will be carried to success. Briefly put, the Jones' Falls project is to fill over the stream in its whole unsightly course from Baltimore street to about Union Sta-



MAP OF BALTIMORE, SHOWING JONES' FALLS

tion and to construct a fine roadway, having a transportation width of 45 feet, sidewalks 15 feet wide for pedestrians and a width over all of 75 feet. It will have an even grade, which means easy hauling from start to finish, and will be of sufficient elevation to do away with all of the bridges now crossing the stream between Baltimore street and the proposed terminus—not counting the Guilford avenue or St. Paul street structures. Some of the intersecting streets will have to be lowered or raised slightly to accommodate the new crossing, but the change in each case, it is asserted,



SECTION OF THE JONES' FALLS IMPROVEMENT, BALTIMORE, MD.

will be for the better, the unsightly hump on Baltimore street, for instance, being done away with. The cost of the undertaking will be about \$1,000,000 in addition to the work which the Sewerage Commission proposes to do. The latter work consists in constructing three concrete conduits for storm water, one to be used for the ordinary dry weather flow and the others as needed for increased amounts of water due to storms.

#### **Municipal Brick Making**

Budapest, Hungary.—The municipal authorities, in consequence of the difficulty experienced in obtaining on reasonable terms from the local brick-makers' combination the quantity of bricks necessary for the carrying out of their great housing scheme, have resolved to lay down a large brick-making plant, and thereby supply their own wants in this respect at less cost. The building operations in this city, commenced last autumn by the State, as well as by the municipality, will this year be carried on with increased vigor.

#### **To Authorize General Contracts for Sidewalks**

Binghamton, N. Y.—An ordinance has been introduced to amend the charter so that the city may make a general contract for constructing cement sidewalks. Lower prices are expected to be secured and better work. A guarantee bond running for two years will be required. Another benefit accruing to the city would be uniform curbs and grades. Under the present method sometimes half a dozen contractors will lay walks on the same street and there will be as many styles of curbs. The City Engineer's Department will be asked for grades, and after these are given several days or a week intervenes before the arrival of the concrete gang. During that time the stakes have been disturbed by being driven over or knocked down, and when the walk is laid it is found to be off-grade. The next walk in the vicinity must be made to conform as near as possible to the defective grade, and trouble results. If the walk is laid on a new grade then the defect in the first walk mars the symmetry of the entire street.

#### **To Surface Macadam with Asphalt Blocks**

East Orange, N. J.—Chairman Joseph Lee of the Road Committee of the City Council, with City Engineer Frederic A. Reimer, visited New York to inspect roads that have been resurfaced with asphalt blocks laid over telford pavement and to determine whether that method of repairing streets would be worth trying in East Orange. They went at the invitation of a road building concern, which has submitted a bid for the test mile of resurfacing, which the Council asked for at a recent meeting. The company offers to do the work at a cost of \$1.57 a square yard. Resurfacing with tarvia would cost 37 to 40 cents a square yard, while the old-fashioned method of cracked stone and dirt binder averages about 28 cents. No method that is entirely satisfactory has yet been hit upon by the committee. Where the roads have been resurfaced with the asphalt blocks the top is trimmed down to the necessary depth and smoothed off, after which an inch layer of mortar is laid. On this are placed the asphalt blocks, 2x5x12 inches in size, after the manner of mosaic flooring. It is claimed that the blocks do away with the tendency to crack, common to ordinary asphalt roads, and that the surface wears well. One of the streets the committee will inspect is West Seventy-second street, where the blocks have resisted wear, it is claimed, for a long time.

#### **City Officials Build Crossing at Night**

Fort Worth, Tex.—Between 7 o'clock and midnight on March 21 two gravel roads were constructed across the Santa Fé tracks at Lipscomb and Capps streets, which have heretofore been closed to traffic. While a squad of policemen, under Night Captain Blanton, stood guard, Mayor Davis, Police Commissioner Mulkey, Deputy Street Commissioners Allen and Renfro and forty men and teams did that which the City Commission and numbers of South Side citizens have been trying for many months to induce the Santa Fé road to do. The party of officers arrived on the scene shortly before 8 o'clock, and with all of the city teams and about twenty-five more in their employ, the gravel from the large deposit of the Texas Bitulithic Company at Capps Parks began to move toward the Santa Fé crossing on Lipscomb street. The wire fences that were constructed about a month ago on either side of the track had vanished. Before 10 o'clock there was a broad gravel road that would do credit to any city stretching across the five tracks for a distance of 100 yards.

#### **To Make Special Roadways for Automobiles**

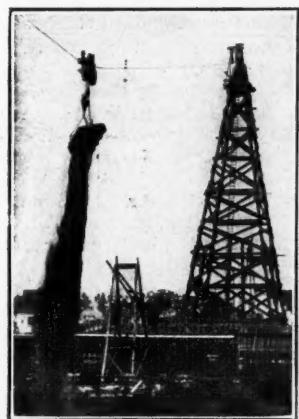
Jacksonville, Fla.—Plans for the laying out of county roads so that the center could be used for teams and each side for automobiles have been submitted to the Board. The purpose of the plans is to reduce the possibility of collisions between autos and wagons.

**Board to Pave and Repair Without Contracts**

Kansas City, Mo.—To empower the Board of Public Works to pave and repair streets and issue tax bills for the work without letting contracts is the purpose of an ordinance passed by both houses of the Council last week. It is to give effect to a provision of the new city charter for this purpose and is intended to provide for the operation of the municipal paving repair plant. It will do away with much red tape.

**Building Concrete Bridge with Cableway**

Los Angeles, Cal.—The Buena Vista street bridge spanning the river and a railroad yard is being built with the aid of a cableway. As there



Courtesy Los Angeles Express

is much switching going on in the railroad yards, materials could not be transported on the ground. Another peculiar condition arises from the fact that the material excavated for the foundations is sand and gravel of a suitable quality for the concrete of which the bridge is to be made. The gravel screening plant is located near the center of the bridge and the cableway will transport the material backward and forward. The Union Iron Works, the contractor, has agreed to complete the structure in eighteen months. The bridge is one of the largest ever erected in California, and will cost \$182,763. The photographer caught a skip-load of gravel as it was being dumped into the river.

**State Roads Ready for Summer Travel**

New Haven, Conn.—On March 1, 1910, a copy of the following letter was sent to all of the towns in the State—numbering 111—having macadam construction:

We experienced considerable difficulty last year getting the trap rock quarries of the State to supply the towns with trap rock of the dimensions we required for the repair of State roads, namely, one-half to three-quarters inch.

So as to take time by the forelock and get a little ahead of the season, it might be wise for me to say that if the towns were to commence putting the stone on their macadam roads as speedily as possible, they would be able to get their repair work nicely along before the busy season for the crushers commences. This will assist in removing the possibility of a recurrence of the trouble we experienced last year, namely, a shortage of stone.

If you will kindly let me know if it will be acceptable and agreeable to you to have the stone shipped immediately, we will proceed to get the stone out with the utmost dispatch.

If you will state how many carloads of stone you desire shipped at one time, the interval between shipments, and the railroad station to which stone should be sent, it will materially assist this department in securing prompt and satisfactory deliveries.

In answer to this communication, fifty-eight towns have already sent in their requisitions for the year's supply of trap rock splinters for repairs. Orders aggregating about 15,000 tons of stone have already been sent to the quarries. Owing to the congestion which has occurred at the quarries, deliveries of stone are much delayed, but it is understood that very soon shipments will be made with more regularity. This will assist the State in getting the macadam roads in repair so as to take care of the heavy traffic which will begin when the weather becomes settled.

**New Bedford Begins Dust-Laying Early**

New Bedford, Mass.—Superintendent of Streets Charles F. Lawton has started dust-laying work early this year. Four watering carts were put in commission the day before Easter Sunday and are credited with having saved much millinery. Besides the horse sprinklers, the street car sprinkler has been put in service. The oil so far used has been a light oil, purchased from the Standard Oil Company. One car of this material has been used and another is on the way, and a car of dustoline besides. Last year the city used twenty-three carloads and treated sixty of the city's seventy-five miles of macadam.

**SEWERAGE AND SANITATION****Recommendations to Sewerage Committee of Council**

Atlanta, Ga.—Dr. Rudolph Hering has made to the Sewerage Committee of Council a report containing the following recommendations:

Buy at once the three sites for the sewage disposal plants.

Commence as soon as possible the construction of the intercepting sewers to the points where the disposal plants are to be located.

In the meantime, get plans ready for the building of the disposal plants.

Build the first disposal plant to take care of the sewage on the creek that is giving the most trouble.

Use either brick or concrete for the intercepting sewers, but concrete is the best.

There is absolutely no need to change any of the former plans as to intercepting sewers, disposal plants or pumping stations.

**Bill Extends Powers of State Health Board**

Albany, N. Y.—The State Department of Health is backing a measure designed to offset whatever doubt may have arisen through the recent opinion of Attorney-General O'Malley regarding the power of the State Department to compel municipalities to install sewage disposal plants. The bill has been introduced in both Houses of the Legislature by Senator Mackenzie and Assemblyman Wood and specifically gives the Commissioner of Health all powers which the Attorney-General's opinion questions in any regard. A new feature is introduced, under which an order to cease discharging sewage into a stream must have the approval of the Governor and the Attorney-General, but once such an order is issued it becomes the duty of the Attorney-General to secure its enforcement. A clause in the bill dealing with the question of the purity of sewage effluents fixes a penalty of \$50 a day for failure to operate a plant so as to secure an effluent as pure as might reasonably be expected.

**Company to Build Sewer for City to Operate**

Belton, Tex.—The citizens have succeeded in the organization of a stock company to build a sanitary sewer at that place. A capital stock of \$10,000 is provided for. It is the intention to ultimately raise \$20,000 in the enterprise, which, after completion, will be turned over to the City Government to operate on a satisfactory basis, to be agreed upon later.

**Change from Private to Public Sewer System Appreciated**

Newton, Kan.—Citizens are enjoying the benefits of the sewerage system constructed during the past three years. Previous to that there were two systems owned by private companies. For the privilege of tapping these a charge of \$75 was made for residence property and \$125 for business houses. The municipal sewers have been built under the district plan. In one district, the First, the cost of construction was only \$10.50 a lot. One of the old private companies was purchased for \$1,500 and made a part of the Second District system.

**Health Department to Watch Stables**

Norfolk, Va.—During the spring and summer months unusually close vigilance will be kept upon stables in the city by the Health Department with the view to utmost cleanliness in them so that the danger of their infesting the city with flies may be eliminated as far as possible. Health Commissioner Dupuy was in conference with the Board of Control regarding the matter of attention to stables, and upon his recommendation the Controllers ordered that Sanitary Inspector W. H. Jacques, of the Health Department corps of inspectors, be detailed to that work exclusively. Health Commissioner Dupuy holds that stables, being extraordinary breeding places for flies when not properly kept, may become the indirect medium for the propagation of relatively more disease than perhaps anything else the sanitary work of the Health Department has to contend with. "Experiments by the Bureau of Entomology at Washington have proved that stable manure is practically the only substance in which flies can be artificially bred," said Dr. Dupuy, "and from that alone the importance of the most careful keeping of stables, especially in the spring and summer, is obvious."

### Finds Defects in Morristown Sewer

Morristown, N. J.—When the contractors recently employed to make repairs to the sewerage system, which, it was asserted, Antonio Costa, the original contractor, had failed to do, they could not find any pipe in Water street, near Spring street. Two manholes in the street were opened, and a ball rolled into the opening of what purported to be the pipe, but the ball didn't show up at the other end. The investigators looked inside the opening and failed to see a gleam of light, which, they said, should be revealed if the trunk line was properly laid. Clyde Potts, the Sewer Board engineer, was sent for. He discovered that there was a break in the pipe line. Soon workmen opened the street and found that 3 feet of pipe were missing at the manhole near Water and Spring streets. Mr. Potts said that failure to lay the pipe probably came about through some misunderstanding between the men at work on the manhole and the laborers. A force of men, he said, would be put to work at once to remedy the defect.

### Health Board Declares Regulations Should Be Obeyed

San Antonio, Tex.—"The downtown districts can be kept clean and the dust nuisance will be reduced to the minimum if our excellent ordinances regulating street sweeping, street sprinkling and the handling of garbage are properly enforced," is the contention of Dr. E. F. Herzberg, a member of the Health Board, as expressed before other members of the Board at a meeting of that body. More sprinkling, the proper sweeping of the streets and sidewalks and the cleaning of the alleys, are the remedies suggested for the betterment of conditions in San Antonio offered during the meeting. Many complaints have come to the Health Department of late from citizens, property owners, and even tourists, that the dust downtown is almost unbearable, and that the alleys in the business districts are not only unsightly, but a menace to the public health, in many instances. The discussion following brought out the fact that the Board of Health has been urging the enforcing of the health and sanitary ordinances for a number of years, and much improvement has resulted. It is the opinion of the members of the Board that San Antonio is easily the cleanest city in the South, has less epidemic disease, has a lower death rate; but the fact that a great room is present for improvement was clearly brought out in the discussions.

### Sanitary Drinking Water for Horses

Kansas City, Mo.—A drinking fountain for horses that is said to be absolutely sanitary has been invented by members of the Kansas City Humane Society. E. R. Weeks, president of the society, asked permission of the Park Board to install the model fountain in the little park at Fortieth and Main streets. It is of bronze and so arranged that the water is fresh every few minutes. If it proves satisfactory, Mr. Weeks hopes to have it adopted and used in all parts of the city.

### Wants Department of Public Health

Washington, D. C.—In a speech in favor of the passage of a bill introduced by himself providing for the establishment of a Department of Public Health, similar to the other departments of the Federal Government, Senator Owen of Oklahoma declared that, while he was in favor of the conservation of the natural resources of the Nation, "the conservation of the life of our people is of far greater importance, and the conservation of the vitality and efficiency of our people is a problem of the first magnitude, demanding immediate intelligent attention." He spoke against the bureau system of looking out for the public health, asserting that the question was of such great importance that it could not be handled efficiently except by a separate department with powers as great as those now enjoyed by any of the other departments of the Government. The bill introduced by Senator Owen would co-ordinate into one working body all of the various health agencies of the Government. It proposes no new officers, except the secretary and his assistant, and calls for no new appropriation aside from the salaries of the secretaries. "It will provide a number of efficiencies," said Senator Owen, "by preventing duplication."

### WATER SUPPLY

#### Great Reservoir and Filtration Plant for Baltimore

Baltimore, Md.—Messrs. Frederic Pike Stearns and John Ripley Freeman, consulting engineers, in their report to Mayor S. Barry Mahool on the enlargement and improvement of the Baltimore water supply, declare that the acquisition of the Warren and Phoenix properties will be necessary. The Gunpowder Valley, in the opinion of the engineers, is the most desirable site for the reservoir. Many other sites were examined, but none was found in which water would not have to be filtered. A filtration plant of twenty acres of slow sand filtration beds near Lake Montebello and a coagulation settling basin in the valley of Mine Bank Run are proposed. Other points of the report are:

A dam 237 ft. high, which can be increased to 270 or 275 ft. in height, to impound about 21,000,000,000 gallons.

A covered reservoir to hold 15,000,000 gallons, near the filters.

Covering of the high service reservoir in Druid Hill Park.

Construction of a tunnel 6,340 ft. long from the dam to the existing gunpowder tunnel, four-fifths of a mile from its upper end.

A large steel pipe from the filtered reservoir near Lake Montebello to a place near Lake Clifton for distribution.

Retention of the Montebello, Clifton, Hampden and Druid reservoirs or emergency use only.

#### Clear Water Bond Issue Beaten; Will Try Again

Sacramento, Cal.—The proposed bond issue of \$666,000 for a filtration plant in this city was beaten at the polls by the close margin of 177 votes. The vote polled was the heaviest in the history of the city at a bond election, 4,109, of which 2,563 were for the bonds and 1,546 against. The city will probably try again, and the general belief is that if another election is held, the proposition will carry. Professor Hyde, of the University of California, drew plans for the filtration plant.

#### Interstate Water Complication

Blackstone, Mass.—The water bill to allow Woonsocket, R. I., water works to be extended across the State line and furnish the inhabitants of Blackstone with water for fire and domestic purposes has been recalled from Governor Draper of Massachusetts. It will be held in the Senate until the question of the authority of the city of Woonsocket to furnish water is determined. The bill passed both the Senate and House and had reached the Governor. The water bill was recalled in order to give time to settle the city of Woonsocket's authority to furnish the water. As soon as this is settled the bill will go to the Governor for his action.

#### Use Less Water When Metered

Galveston, Tex.—The annual report of City Plumbing Inspector George Klaus shows that while the population has steadily increased for the past four years the water consumption has decreased. This is accounted for because of the installation of meters. Out of 6,400 water services in Galveston 4,447 services are metered and the work of installing meters in all old services is progressing on an average of five or six a day. There is another big advantage in putting in the meters as effecting the insurance rate of the city. The State Fire Insurance Rating Board has charged a deficiency against the city as not being a metered city, as a city is considered metered only when 75 per cent or more of the water services are metered. Galveston will have to install nearly 400 meters before a reduction of 1 per cent will be made in the insurance key rate. In 1906 the annual water consumption was 1,123,627,600 gallons, while for the year just closed, and with an increase of over 4,000 in population, the consumption was over 9,000,000 gallons less, or 1,014,095,000 gallons. The average daily consumption also testifies to the saving of water induced by the meter system. In 1906 the average daily consumption of water in the city was 3,078,432 gallons, while for the year 1909 the daily use of water was over 300,000 gallons less, or 2,750,942 gallons. The average daily consumption of water per capita has likewise decreased, which would indicate that water is not as popular for drinking and other purposes as it was four years ago. In 1906 the average daily consumption of water per person was 85.51, while for last year it was only 68.77 gallons.

**Turtle Creek Pumping Station**

Dallas, Tex.—At a cost of about \$35,000 Dallas has erected and equipped on Turtle Creek one of the most complete water pumping stations in the country, it is asserted. On a foundation of reinforced concrete there is a superstructure of brick and stone. The whole building has the appearance of a well-proportioned three-story structure. Inside there is open space, except for the galleries, and above is the clear story that gives light and ventilation to the place. The boiler room is in the lower section of the building. Its walls sit upon a subfoundation of white rock.



Courtesy Dallas News

NEW WATER WORKS PUMPING STATION, DALLAS

Above this the foundation of concrete rises to a foot above the grade level of earth. The concrete floor is at a level a little more than two feet below the grade line. The room is 44 x 69½ feet inside measure. The south front of the boiler room has walls that rise 39 feet from the ground to the roof. There is a parapet three feet higher. For the big pumping engines there is a room with concrete floor 14 feet below the level of the earth. The place is 64 1-3 x 101 1-3 feet in size. The walls there rise to a height of 43 feet, with a parapet of three feet above the roof line. Boiler room and engine room have a total length of 104 1-3 feet and the greatest width is 101 1-3 feet. In the boiler room are three new boilers of large capacity, either of them sufficient to run the 15,000,000-gallon pumping engine. In the engine room is the new pumping engine, with capacity that may be pushed to 16,000,000 gallons. It cost \$64,000, installed and tested. There is now in process of erection one of the 10,000,000-gallon pumps that for 20 years has done service in the old pumping station. It was taken down and removed to the new place by city day labor and the outfit of the city's well-boring rig, under the direction of Water Engineer Bassett. Some of the parts will be replaced, and it is said the rebuilt engine will be as capable as a new one. The removal work cost about \$860. Rebuilding will not cost a greater sum, it is stated.

**Water Works Respond to Election**

Lestershire, N. Y.—On the day following the election, at which a proposition to issue bonds for water works repairs and extensions was voted down a breakdown occurred that reduced the supply by more than half.

**Water Main Break Causes Gas Famine**

Springfield, Mass.—A break in a 24-inch water main at State and Water streets March 21 resulted in cutting off the supply of gas from the lower part of the city and reduced the pressure all over the city. The gas main that supplies the business part of the city was broken and filled with water and sand. A large number of gangs of men with hand pumps were placed in various places in the lower parts of the city, but it was two days before normal conditions were restored. Besides cutting off the gas supply, other damage was done. The basements of the plants of the gas and electric light companies were flooded and machinery damaged. The pressure on the register at the water office at the time of the break was 140 pounds.

**Macon Considering Municipal Water**

Macon, Ga.—The city must decide within the next ten months just what action will be taken on the water works question. The contract with the Macon Gas Light and Water Company expires on February 1, 1912, and notice as to the city's intention must be given one year before the date of expiration. A special committee will be appointed by Mayor Moore to look into the matter very fully and carefully, possibly going to other cities to study the operation of municipal water plants.

**New Pump Installed**

Temple, Tex.—In the presence of the Board of Municipal Water Commissioners, members of the City Council, Mayor-Elect F. P. Hamill and a number of private citizens, a trial test was made at the pumping station on Leon River, six miles west of the city, of the new pump that has recently been installed. This pump will result in quadrupling the water supply of the city at a reduced expense. It replaces two antiquated pumps, whose combined capacity was only 750,000 gallons per 24 hours. The normal rating of the new pump is 3,000,000 gallons. The daily consumption of water in Temple is estimated at 1,500,000 gallons; hence, preparations have been made for doubling the supply on demand at any time.

**STREET LIGHTING AND POWER****Duluth Councilmen Want Municipal Lighting Plant**

Duluth, Minn.—The Council has passed, by unanimous consent, a resolution calling upon all candidates for the Legislature from the Forty-ninth, Fiftieth and Fifty-first Districts to pledge themselves in support of a bill which will enable Duluth to issue bonds to enable it to acquire an electric light plant, either by purchase or by building. Under the terms of the resolution the City Clerk is instructed to submit forms embodying this pledge to the candidates at least fifteen days before the primary election in September, and to notify the Council of the result ten days prior to that date. The lighting contract with the Duluth-Edison Electric Company expires next year. The present contract has been considered reasonable by the Aldermen, each of the street lights costing about \$50 per year. Previous Councils have interested themselves in the municipal lighting proposition, and at the last Legislature several attempts were made to get such a bill through the Legislature. But the delegation failed to accomplish anything, because of the overwhelming importance of the tonnage tax issue.

**To Bury Light Company Wires**

Johnstown, Pa.—The Citizens' Light, Heat and Power Company will shortly start the work of putting its wires underground in the central part of the city, embracing the territory between the two rivers. It will be a job of considerable proportions, and one that will require the greatest care, owing to the danger from high water which must be guarded against; but it is expected that in the course of a few months it will be accomplished and the overhead wires in the center of the city done away with. The operations will be started at the lower end of Main street and pushed eastward. As a matter of fact, the Citizens' Company now has a considerable mileage of wires underground, but none of it is in use. It has been in place for six or eight years, having been acquired when the plant of the Consumers' Company was absorbed, and the value of it is said to be considerably larger than at that time, owing to the advance in the price of wire. This wire is in conduits, and the several floods that have occurred since it was put down have washed mud and other matter into the conduits until the wires are as firmly fixed there as if they had been cemented, while the vacant compartments in the conduits have been plugged full. The wires are all encased in lead sheaths, and it is believed they are in good condition and can be used, but it will be necessary to loosen them up so that they can be drawn out and handled for making connections and other purposes. It will also be necessary to clean out the unused compartments in order to put in additional wires. This cleaning-out process is going to present no small difficulty. It will be undertaken by forcing water through the conduits, and possibly in some places it will be necessary to dig down and break into the conduits.

**Offers to Equip and Run Lighting Plant**

Binghamton, N. Y.—A proposition has been made the Aldermanic Committee which is investigating the feasibility of establishing a municipal lighting plant in this city, by W. J. Buckley, of The Engineering Supervision Company, of New York City, which will undoubtedly be given careful consideration. Mr. Buckley offers to take any municipal lighting plant which the city may build, give a bond to maintain it in perfect condition, and operate it for a term of three, five or more years, and at the end of that time turn it over to the city in exactly the same first-class condition in which they received it and furnish the city with its street lighting at a price to be fixed per light. The Engineering Company will purchase all coal and supplies, and make any repairs that may be necessary at its own expense. It will pay all cost of maintaining the plant and give Binghamton a much better light than it is now getting, at far less cost. In Brunswick, N. J., the company is operating a plant under this contract, and furnishes 250 lights at \$45 per lamp. As Binghamton is now paying \$75 per lamp, the difference in cost would more than pay the interest on the investment in a plant, and at the end of the term of years the city would have a first-class electric plant which it could then operate for itself. One of the principal difficulties faced by the investigating committee has been the problem of how the city could operate a municipal lighting plant to advantage after it was built; where competent management could be obtained, and how to make the best of the investment. The present proposition is believed to cover this ground and will be carefully weighed by the committee in its report.

**Electric Lamp Posts for Shaded Street**

Rochester, N. Y.—Steel electric lamp poles of a unique design and made in Rochester are to be erected in Lake avenue, between Lyell avenue and the Ridge Road. The work will be begun about April 1 and will be rushed to completion in as short a time as possible. The present poles will be removed. There are now forty-two poles in Lake avenue between the streets mentioned, but with the erection of the new poles the number will be increased by fifteen. This is a continuation of the work begun last year, with the removal of the overhead wires from the avenue. When the matter of erecting new poles arose for consideration it was pointed out that the present lamps, shaded by the foliage when the trees are in full leaf, do not give the light they ought. The engineers were given the problem of getting the lamps out from under the trees, so as to illuminate the roadway and sidewalks as perfectly as possible. This was to be done, the engineers were told, without trimming the trees. It was decided in the beginning that it would be necessary to suspend the lamps at a short distance beyond the curb in order to give them what little benefit there was in the upward bend of the lowest limbs of the trees. It was also decided to make a crane 14 feet in length, the inner end to be connected with the pole and the outer end to support the lamp. Plans were accordingly drawn and the poles were ordered.

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**FIRE AND POLICE**

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**Fire Marshal Ordinance**

Austin, Tex.—The State Fire Rating Board has received several hundred printed copies of its form of city ordinance creating the office of Fire Marshal, describing the duties thereof, providing for its maintenance and prescribing penalties for violations. These forms are for free distribution upon application, and can be adopted or enacted by any city or town in the State and their enactment will cause a reduction in the key rate of the city adopting the same of 3 cents per hundred in the cost of fire insurance. A number of cities and towns requested the Board to prepare the ordinance so as to conform to the underwriters' requirements and secure the reduction mentioned in insurance rates. It is now expected that this ordinance will be generally adopted and reductions in key rates effected throughout the State. The Board has in press the form of an ordinance regulating building construction so as to reduce the fire hazard and its adoption will result in a reduction in the fire insurance rate of 5 cents per hundred. This ordinance will soon be ready for free distribution.

**TWO AUTO FIRE-FIGHTERS BURNED****Engine Working at High Pressure Bursts Into Flames—Chief Croker's Machine Destroyed on Way to Fire**

Wilmington, Del.—While the new combination auto fire engine of the Reliance Fire Company was being tested Saturday afternoon it suddenly burst into flames and was badly damaged before the fire was extinguished. The engine had been taken to the city pumping station, where efforts were made to have it throw a stream over the smokestack, which is the highest in town. The engine was working under high pressure when flames burst from under the hood. The firemen formed a bucket brigade, but could not extinguish the flames before the fire had spread to the body of the apparatus and damaged it to the extent of several hundred dollars.

New York, N. Y.—Fire Chief Edward Croker's relief automobile, a 30-horsepower car that he uses when his big machine is undergoing repairs, was consumed by fire that also damaged the house of Engine Company 33, in Great Jones street, where Croker makes his headquarters, at 2 o'clock Sunday morning. An alarm was received from Thirteenth street and Fourth avenue, and Chief Croker and Captain Lusk, his chauffeur, hopped into the automobile. Fireman Fenney gave the crank one turn, when there was an explosion and flames leaped up to the ceiling. The car was destroyed in a few minutes and the burning ceiling was ripped away for several feet to keep the fire from getting into the second floor.

**Montclair New Fire Department Started**

Montclair, N. J.—By action of the Town Council of Montclair the Volunteer Fire Department, in existence since 1882, was abolished and what is known as the call system organized in its stead. The new department will consist of the ten paid men who have been on the rolls for several years and six additional men, who were retained at a salary of \$70 per month, with an increase of \$5 a month each year until a limit of \$85 a month is reached, which is the salary paid men are receiving now.

**New Brunswick's Fire Department**

New Brunswick, N. J.—Prompted by an agitation on the part of the Board of Trade of the city, the Common Council has put on foot an investigation of the Volunteer Fire Department for the purpose of learning how it can be bettered, with the ultimate purpose of securing a reduction in the fire insurance rates of the city. According to the report of the Committee on Fire Prevention of the National Board of Fire Underwriters, fire protection is lax in this city, a conclusion which is vigorously disputed by the friends of the Fire Department. For years there has been a quietly expressed sentiment among the merchants and manufacturers of the city that the Volunteer Fire Department should be replaced with a paid department, to keep pace with the progress of the city. No official has ever had the conviction or courage to champion the cause, as the Fire Department plays an important part in local politics.

**Private Fire Tug Not Available for Public Use**

Oakland, Cal.—The Board of Public Works has endeavored to arrange with the Alaska Packers' Association for the use of the latter's tug, which has been equipped with pump and nozzles, with a view to protecting the company's property from fire. It was thought that the company might allow this boat to respond to alarms of fire along the Oakland water front. It was stated in reply to an official request that the boat was built primarily for general tow-boat service and was frequently on the San Francisco side of the bay engaged in this work, and that it could not be depended on to answer alarms. Oakland has no fireboat.

**To Save Expense of Call Men**

Portland, Ind.—To reduce the cost of attending fires, the City Council approved a plan proposed by Fire Chief A. O. Roll. Three minute men in each of the four wards, in addition to the three regular men, will be named. When a fire occurs, the number of blasts from the water works whistle will indicate the location of the fire, and only the minute men from that ward will attend unless especially summoned by the Fire Chief. The minute men being paid 50 cents per hour, or fraction, it is expected this plan will mean a considerable money saving, as the greater number of fires are trivial and really require only the regulars.

## GOVERNMENT AND FINANCE

### Blue Laws at Elkhart

Elkhart, Ind.—"Just to show the public what the Sunday blue law is if strictly enforced," Mayor Chester last Sunday closed drug stores, tobacco and refreshment stands and all manner of business places. He intended retaliation against the Ministerial Association, which had accused him of insincerity in the prosecution of managers of cheap theaters that have operated on Sunday. Milk and ice were delivered only in cases of absolute necessity. Livery stables and automobile garages were locked tight. Electric cars to nearby cities were crowded with people seeking amusement.

### Annexation Fever in Indiana

Gary, Ind.—At a special session of the City Council Gary annexed Hammond, East Chicago, Whiting and Indiana Harbor. The week previous East Chicago, learning she was to be annexed by Hammond, annexed Hammond and Whiting, and to protect itself from the annexation fever now raging in this part of the State, Gary took annexation steps herself. "Until we had defeated annexation in the courts we could not sell a bond for any local improvement or for school purposes. We don't want East Chicago, and apparently the only way to defeat them from getting Gary is to annex first," said Mayor Knotts. If the Council proceedings hold good in court the amalgamated city will have 100,000 inhabitants and be the largest city in Indiana outside of Indianapolis. The news that Gary had annexed all the Calumet region has caused more excitement in this part of the State than anything that has happened since the Civil War. Should the towns object to being "annexed," a protest must be made by two-thirds of the voters and the protest upheld by the courts.

### Move to Form City of Calumet

Hammond, Ind.—At a meeting of the City Council in East Chicago, Hammond and Whiting were annexed to East Chicago, and the first steps were taken to amalgamate the cities of East Chicago, Indiana Harbor, Whiting and Hammond. The amalgamated cities will have a combined population of 75,000, and if the movement is successful the new city will be called Calumet, and will be the third largest in the State.

### Seek Funds for Municipal Research Bureau

San Francisco, Cal.—The Public Welfare Committee, in soliciting funds for a municipal research bureau, make the following appeal: "The Public Welfare Fund Committee is attempting to raise a fund of \$50,000 per year, one of the principal purposes being the financing of a municipal research bureau in this city, for the auditing and reviewing of the expenditures of all moneys of the city and county. It will be the purpose of the bureau to take up the tax budget in its entirety and trace to the minutest items the expenditure and administration of all public funds, in buying materials, supplies, and whether such materials and supplies are applied to the uses for which bought—in the letting of contracts of any kind, and, in fact, all expenditures of whatever nature. It will also undertake to investigate the manipulation of all properties and sources of revenue of the city outside its tax rolls. The bureau, if established, will have in its employ a competent engineer and expert accountants, and all its reports shall be made public.

### Utility Regulation for Jersey Corporations

Trenton, N. J.—Governor Fort has signed the Wakelee Public Utilities bill, and after July 4 next every express company, street railway, traction, canal, subway, pipe line subway, gas, electric light, heat and power, water, sewer, telephone, telegraph or corporation, association or joint stock company, in addition to every steam railroad company, will be subject to State regulation. Governor Fort, in announcing that he had approved the measure, said he had been assured by Attorney Wilson, former Justice Bennett Vansyckle, of this city, and Chandler W. Riker, of Newark, that it was constitutional. He said also that he had fully consulted Railroad Commissioner Frank H. Sommer as to the value of the law to effectively regulate utility companies, and he was convinced that it is in many respects an effective measure.

## STREET CLEANING AND REFUSE DISPOSAL

### Fifty Women Sweep Streets of Chester

Chester, Pa.—Half a hundred women, most of them garbed in long gingham aprons and wearing tight-fitting dust caps, but several dressed in overalls belonging to their husbands or big brothers, made the dust fly in all directions upon the highways of the Fifth Ward recently. They turned out in squads of fives and sixes, at the call of Alderman Alfred C. Rhoads, to clean the streets, which have long been neglected by the city, and they made a good job, too. The Fifth Ward is now the cleanest spot in the city, and those who are responsible for its cleanliness say they are going to repeat the operation at stated periods unless the men whom the taxpayers hire to do the work get on the job and do their duty.

### Incinerator Is Delayed

Milwaukee, Wis.—Time for the completion of the new garbage incinerator was extended to May 15 by the Board of Public Works at the solicitation of E. H. Foster, vice-president of the Power Specialty Company, which is building the plant. The Commissioners were requested to extend the time three months. The original contract called for completion of the plant on April 1. It is expected that the official tests of the destructors will begin on May 15, under supervision of Hering & Fuller, consulting engineers, New York.

### Council Will Keep Streets Clean

Puyallup, Wash.—Dr. S. D. Barry, City Health Commissioner, appeared before the City Council to ask that receptacles be placed at intervals along the principal thoroughfares of the business district for rubbish. He also asked that, as a benefit to the public health and as a good thing from a number of other standpoints, some method be adopted for cleaning the city's newly paved streets. These matters were referred to the Board of Health and the Street Committee for action. They will plan a system for cleaning the streets and take other steps for the general health of the city. Dr. Barry said that at least twenty waste paper receptacles should be placed about the city.

### Sprinkling Contractors Made Liable for Damages

Dayton, O.—Secretary Daniel J. Murphy of the City Engineering Department has inserted a slight change in the sprinkling specifications for this year that may save the city considerable annoyance and loss of money. According to the specifications as originally drafted, the successful bidder for the sprinkling contract was to be held liable for damages resultant from the operation of the carts or the fulfilling of the contract, and such damages were to be deducted from the monthly payments for his services. Inasmuch as these payments will not amount to a very considerable amount of money, it is obvious that the clause is of a limiting and restrictive nature, and might have resulted in the city having to pay the bulk of a damage suit had not the specifications been changed in time. The specifications will be so worded that the contractor will be liable for damages to the full extent of the injury.

### Elimination of Dust Evil in Milwaukee

Milwaukee, Wis.—Elimination of the dust evil through better care of streets as a means of bringing about a cleaner and healthier city is the keynote of the annual report of Dr. G. A. Bading, Commissioner of Health, which was submitted to the Common Council. Dr. Bading calls attention to the fact that the dust evil in Milwaukee is assuming great proportions and that the present system of cleaning the streets must be improved to keep the atmosphere pure. The dust evil is reported as being the cause of a great deal of sickness, especially during the spring and fall months. The adoption of the flushing system of keeping the streets clean and free from dust is recommended by Dr. Bading, who favors tin receptacles for street refuse. "Why no attention is paid to this important subject, which is of the greatest interest to all taxpayers, not only because of the thousands of dollars worth of merchandise of all kinds which suffers deterioration and leads to financial loss, is difficult to understand," says the report. "Intelligent co-operation between all departments and prompt consideration of important departmental measures will make for a cleaner, healthier, and, therefore, greater Milwaukee."

## RAPID TRANSIT

### Council Complains of Street Car Service

Albany, N. Y.—Council has filed a complaint with the Public Service Commission charging that the service supplied by the United Traction Company is inadequate. The resolution declares that the seating capacity is insufficient, the platforms too small and the cars poorly lighted and not run with regularity. All of this is denied by the company in its answer, in which a dismissal of the complaint against it is asked by the commission.

### Brooklyn Promised Subway in Three Years

Brooklyn, N. Y.—The Public Service Commission promised a delegation from the Brooklyn Heights Association at a special hearing to start work on the tunnel under the East River, through which trains of the Pineapple street subway will be operated, as soon as plans can be prepared, and the approval of the Board of Estimate can be obtained. Commissioner McCarroll said he hoped trains would be running through this tunnel well within three years.

### Safer to Have Motorman in Sight

Worcester, Mass.—As the result of a fainting spell sustained by a motorman on the Blackstone Valley line of the Worcester Consolidated Street Railway Company a few weeks ago and the resultant crashing of his car into one in front, a new order has gone into effect on the lines of that company whereby the curtains that hide the front vestibule from the passengers shall hereafter be raised six inches from the bottom of the glass at all times. The motorman in question dropped at his post a few weeks ago and the car ran wild until it collided with one in front. Luckily there was little damage. The same thing might have happened at night on a grade and the results would have been serious.

## MISCELLANEOUS

### Successful Emblem Has Been Selected

Birmingham, Ala.—The emblem which is to represent the genius of Birmingham has been selected. The committee having the matter in charge is of the opinion that it will become popular immediately and will be very effective in advertising Birmingham. The contest has given Birmingham wider advertisement, caused a more general study of the city's wealth and strong points, and aroused more interest than any other scheme which the Chamber of Commerce has ever attempted. Over 160 designs were submitted by people from all over the United States. One came from Italy, and many of them represent hard work and artistic talent. The committee, after several weeks of hard work, finally sifted the matter down to about ten designs, and after long deliberation selected the winner last week.

### Complete Map of Charleston, W. Va.

Charleston, W. Va.—After considerable work, City Engineer W. A. Hogue has finished one of the most complete maps that was ever made of the city of Charleston, which will be used by the West Virginia Inspection Bureau. All the water mains of the city are shown, the location of the hydrants, fire limits and the streets that are paved. The number of miles of street in this city is 82.5 miles, of which 23.5 miles are paved. The area of the fire limits is 21 square miles. In Charleston, west of Elk River, there are 2.35 square miles, and on the east side of the river 2.30 miles, while on the south side of the Kanawha the area is .85 square miles, making a total of 5.5 square miles.

### Village Would Borrow City Hall

Columbus, O.—What is thought to be an absolutely new idea in city halls was made known when Mayor Aloysius Kunkler, of Hanford, a Franklin County municipality, asked the County Board of Elections to lend the Council a wheeled voting booth to be used as municipal headquarters. Hanford has just been incorporated and has not a dollar in its treasury. Its only municipal possession is a quarrel in Council, from which two members threaten to resign. The Board of Elections refused the request for the "loan of a city hall."

### Boston to Fight Smoke Evil

Boston, Mass.—John S. Lawrence, chairman of the Fuel Committee of the Boston Chamber of Commerce, declared before the Legislative Committee on Metropolitan Affairs that the largest vote ever recorded by the Chamber favored by almost twenty to one legislation to abolish the smoke nuisance in Boston. There were two bills before the committee, those of Representatives David T. Montague and Channing H. Cox, of Ward 10, and a substitute submitted by the Chamber of Commerce. The former provides that no dark or gray smoke shall be allowed to escape from a building for more than six minutes or from a locomotive for more than two minutes in any single hour of the day or night unless a permit has been secured. The penalty for violation is placed at \$100 for each week or part of a week that the law is violated.

### City Tree Nursery a Failure

Cleveland, O.—City Forester Frink has submitted a report to Director of Public Service A. B. Lea, stating that the tree nursery set out at Warrensville under the last administration is a failure. But few of the trees, he says, are fit to be removed and set out in the streets of Cleveland, and most of them will be taken out and burned if his advice is heeded. Frink says the reason for the failure was that the soil was not put in a high state of cultivation. He says further that the ground is wet and untiled, and for this reason the trees will not flourish. Of the 1,008 soft maples on the ground only 200 can be used, he says. His report further states that out of 354 Scotch elms but 50 can be used, and out of 431 ash-leaved maples but 75. There are 950 European sycamores set out at the Warrensville nursery, and of these but 90 can be used. The rest of the trees are failures and can only be removed and burned. Of the 230 horse-chestnuts set out but 30 can be transplanted for city use. Frink favors a city nursery, but believes that a new location should be selected at the Warrensville farm if the present site is not drained and the proper soil put in. He says the city would save \$500,000 by raising its own trees and park shrubbery. Within the past three years the city has set out 20,344 trees, costing \$14,930.10. This number did not meet the city's needs. The city could use 75,000 to 125,000 trees, he asserted.

### May Move Town to Oklahoma

Kiowa, Kan.—Kiowa, one of the important towns of southern Kansas, and historically famous in pioneer days, located near the Oklahoma-Kansas State line, may be moved across the line into Oklahoma if present plans materialize. It is claimed that Oklahoma has a lower freight rate than Kansas and that grain dealers on the Oklahoma side are enabled to pay more per bushel for wheat than do the Kansas grain dealers. For this reason the business men of the town are considering moving into Oklahoma.

### Possible Uses of Public Square

Mason City, Ia.—Mayor F. A. Kirschman has notified the Park Commissioners that they must keep their hands off the public square, otherwise designated as "the park," as it is not a park; therefore, the Commission has no right there. The Mayor has been digging up some old records and has found that the public square, as he terms it, was presented to the city as a market square and not a park; that it is city property and not necessarily public in the nature of a park, and the Commission can make no plans for its improvement or its care. What the Mayor has in mind is not yet understood, though it is known he has been advocating the erection of a City Hall in the center of the square, which is in the geographical center of the city. The Park Commissioners, however, are inclined to think the Mayor is acting without authority and will oppose his efforts to keep them out of the park.

### To Place Insignia on All City Property

Toledo, O.—The insignia of the city, as shown in the centre section of the city flag, is to be placed on each article owned by the city. One of large size will appear on the wagons and fire apparatus, and the emblem will grade down to the small size to be placed upon each implement used in the city's work. This design is a conventionalized block house, in red, on a field of white, within a circle of blue.

## LEGAL NEWS

### A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

#### Water Company—Furnishing Water to City—Compensation

C. H. Venner Company vs. Urbana Water Works.—Kirby vs. City of Urbana.—Under a contract between a water company and a city for the furnishing of water to the city for fire purposes, which required the company to maintain a certain pressure at the hydrants, and provided that in case it failed to comply with the contract it should be served with notice, "and from and after service of such notice" rental should cease and not again begin to accrue until the deficiency was remedied, the city cannot avoid the payment of rental on the ground that a test made by it within three months before the expiration of the contract showed that the pressure was not up to its requirements, where no notice of the fact was served on the company, and especially where, at prior tests, the pressure had also been below that required, but the city had continued to accept the service without objection, and it was also shown that to maintain the full pressure required would seriously injure the private water service, which was dependent on the same pumps. The receiver of a water company furnishing water to a city for fire purposes without contract as to price is entitled to recover, as a fair compensation for the service, a just proportion of the operating expenses, taxes and cost of administration paid by the company, and of a just and reasonable return on the cost of reproducing its plant and its going value. The receiver for a water company authorized to increase the rates to be charged to private consumers for water furnished.—United States Circuit Court, 174 F. R., 348.

#### Defect in Street—Light Pole

Giuricevic vs. City of Tacoma.—The provision of Tacoma Revised City Charter, requiring written notice to be served on the City Council for all claims for personal injuries sustained from any defect, want of repair, or obstruction in any street, etc., is inapplicable to an injury to a workman engaged in grading a street from the falling of an electric light pole.—Supreme Court of Washington, 106 P. R., 908.

#### Regulation of Telephone Companies

City of Owensboro vs. Cumberland Telephone and Telegraph Company.—Under the law of Kentucky, which holds that the use of a street by a telephone company is for a public, and not a private, purpose, general power expressly given to a city by a special charter to "regulate" the streets, alleys, etc., imports power to control their use, the word "regulate" being a word of wider import than "control," and authorizes the city to grant the right to a telephone company to erect and maintain its poles in the streets, and such a grant in the nature of a contract, made before the adoption of the State Constitution of 1891, under which the company proceeded to build and operate its lines and exchange at a large expense, is not affected by such Constitution under the proviso of section 163.—United States Circuit Court of Appeals, 174 F. R., 739.

#### Breach of Contract—Mental Anguish

Birmingham Water Works Company vs. Vinter.—Mental anguish is not a recoverable element of actual damages growing out of a mere breach of contract. In an action against a water company for breach of contract to supply water to plaintiff at his residence, it was error to charge that plaintiff could recover for "distress" and "outraged feelings," those terms covering mental anguish.—Supreme Court of Alabama, 51 S. R., 356.

#### Municipal Improvements—Repeal of Statute

Gardner et al. vs. City of Bluffton.—Acts of 1905, relating to municipal improvements, were not repealed by Acts of 1909, relating to the same subject, but were merely amended, and the right to make street improvements continued under modified terms and conditions of procedure. A rehearing will not be granted for the purpose of considering a constitutional question which was not presented at the original hearing.—Supreme Court of Indiana, 90 N. E. R., 898.

#### Grading Streets—Damages to Abutting Owners

Landry et al. vs. City of Lake Charles.—The City of Lake Charles graded streets in front of the property of the plaintiffs and lowered their level, increasing considerably the distance from the top of the sidewalk to the surface of the street, and making it more difficult to step from the street to the sidewalk. The defendant also diverted the course of water so that it flowed through the gullies before the property of the plaintiffs, and by eroding and washing away the unstable soil caused them damage, the right to recover for which is not contested. It is only a question of amount. These damages cannot be set off by the benefit derived by the plaintiff in common with other property owners from the changing of the grade of the street, especially where the plaintiff does not seem to have derived any great advantage from the work, as in this case. Plaintiff had three driveways leading from the street to his property, and these defendant could not destroy without replacing them to the extent made necessary by the new grade of the street. Flights of steps rendered unserviceable by the new grading must also be replaced by the defendant. A municipality has the right to remove trees for the improvement of the sidewalks, provided that this removal is not wanton. Therefore, plaintiff is not entitled to recover for the six water oaks removed for that purpose. Defendant is liable for the curbing necessary to support and strengthen the sidewalk, as the owner is liable only for ordinary repairs, and the improvements of the defendant are not of a usual character, and plaintiff cannot be made to construct new sidewalks, which is beyond his obligation to make ordinary repairs.—Supreme Court of Louisiana, 51 S. R., 120.

#### Defective Streets—Evidence

Falladin et ux. vs. City of Seattle.—In an action for personal injuries caused by a defective sidewalk, evidence as to the defective condition of the sidewalk a few days or weeks before the accident in the locality where plaintiff was injured as well as evidence of accidents to others happening in the same locality about the same time, was admissible to show constructive notice of the defect to the city.—Supreme Court of Washington, 106 P. R., 914.

#### Highways—Alteration—Discontinuance

Inhabitants of Cohasset vs. Moors.—Where County Commissioners altered a road, and located the alterations by courses, metes and bounds, any part of the former way outside of these boundaries is thereby discontinued. Where a town claimed certain property as being within the limits of a highway, and respondent claimed by adverse possession beginning in 1872, and the judge correctly ruled that there was no evidence that the locus was any part of the highway subsequent to that date, a further ruling that there was no evidence that it was part of the highway prior to that date was immaterial. A claimant by adverse possession, who shows that disseisin has continued without interruption 20 years or more, need not show the date of disseisin. A claimant by adverse possession need only prove his case by a fair preponderance of the evidence, and the court properly refused to instruct that the claimant has proved a strong case.—Supreme Judicial Court of Massachusetts, 90 N. E. R., 978.

#### Street Obstructions—Precautions Against Injury

City of Georgetown vs. Groff et al.—A city must keep its streets in a reasonably safe condition, and where, in making improvements, it becomes necessary to place obstructions therein, it must use reasonable care to protect persons using the street at night from injury by giving notice, by the use of lights or other means, reasonably sufficient to warn the traveling public of the presence of the obstructions.—Court of Appeals of Kentucky, 124 S. W. R., 888.

#### Paving Contract—Variance from Specifications

Mixer vs. Adam, Mayor, et al.—That a street paving contract provided for paving on a concrete base, while the specifications on which the bids were received provided for a macadam base, did not deprive the contractor of the right to recover from the city for the reasonable value of the work and materials furnished, though the contract was void, the city having levied and collected a special assessment for that purpose.—Supreme Court of New York, 121 N. Y. S., 31.

## NEWS OF THE SOCIETIES

**Engineers' Society of Pennsylvania.**—The second annual convention of the society will be held in Harrisburg June 1-4 in the State House. An attendance of 2,000 is expected, and there will be a large manufacturers' exhibit in the new car barn of the Central Pennsylvania Traction Company. Arrangements for the convention have been made by the executive committee of the convention section of the society, and on this committee are President J. V. W. Reynders, of the society, and vice-president of the Pennsylvania Steel Company; Prof. John Price Jackson, State College, chairman; Major D. F. A. Wheelock, Warren; H. S. Smith, Wilkes-Barre; Alfred T. Damon, Jr., Darby; Frans Engstrom, Altoona, and Edward R. Dasher, secretary. The convention will be greeted by Governor Stuart and presidents of the Engineers' Clubs of Philadelphia, Pittsburgh and Scranton will make addresses. The plans as outlined call for a smoker on Wednesday evening, a banquet on Thursday evening at the Board of Trade auditorium, a reception on Friday night and an excursion on Saturday.

At a recent meeting of the Harrisburg section of the society the following resolution was passed:

Resolved, That the Board of Directors do and are hereby instructed to prepare a suitable set of resolutions expressing the sentiments of the Engineers' Society of Pennsylvania in favor of a liberal support of the park system, and favoring the maintenance appropriation as now provided in the ordinance before Common Council.

That copies thereof be sent to the Mayor and both branches of Council.

**American Society of Engineering Contractors.**—The annual meeting of the society will be held in the United Engineering Society Building, 25 West Thirty-ninth street, New York City, on Tuesday, April 12. At 2:30 p. m. the ballots of the annual election of officers and directors will be opened and counted, amendments to the constitution will be considered, and a discussion will take place on the subject, "Management of Men." At 8 p. m. the result of the election for officers and directors will be announced, and a lecture on "Ancient and Modern Water Works," illustrated by lantern slides, will be delivered by Edward Wegmann, Consulting Engineer of the Aqueduct Commissioners of the City of New York. Daniel J. Hauer is secretary of the society.

**Boston Society of Civil Engineers.**—The sixty-second annual meeting of the society was held at the Boston City Club March 16. About 160 members were present at the annual dinner in the afternoon and about 300 at the smoker in the evening. On motion of William S. Johnson the society voted unanimously to publish an independent journal as soon as the finances would warrant it. At the conclusion of the dinner in the evening Past President John R. Freeman gave an illustrated description of the construction of the Los Angeles Aqueduct, which is being built from the Owens River in the Sierra Nevada Mountains to the San Fernando Valley. The officers elected for the ensuing year are as follows: President, Henry F. Bryant; vice-president, James W. Rollins, Jr.; secretary, S. Everett Tinkham; treasurer, Charles W. Sherman; librarian, Frederic I. Winslow; director, Frank A. Barbour.

**New England Water Works Association.**—A special meeting of the association will be held at the Allyn House, Hartford, Conn., April 13, according to notice sent out by Secretary Willard Kent. The programme follows:

11 o'clock—Rooms in the Allyn House will be open for the use of members. 12.30 o'clock—Meeting of the Executive Committee at the Allyn House. 1 o'clock—Lunch will be served at the Allyn House. 2 o'clock—Business, action upon applications for membership. Topical discussion, an opportunity will be given members to present verbally any practical question for discussion, or it may be presented in writing before the meeting. Discussion: Secondary water supplies, their dangers and value; several of our members have signified their willingness to present different phases of this question, and all having had charge of the inspection and maintenance of check valves are requested to present their experience; the discussion will be opened by E. E. Lochridge, C. E., Springfield, Mass. Paper, "Forestry," by Mr. L. W. Goodrich, Forester for the Water Department of Hartford. It is expected that several others having had experience in this line will discuss the subject in its application to water supplies.

**Scientific and Engineering Societies of Boston.**—The following societies have appointed representatives to consider the broad question of bringing together under one roof the scientific and engineering societies of Boston:

Boston Society of Civil Engineers: George A. Kimball, Charles S. Clark, Luerne S. Cowles:

American Institute of Electrical Engineers: Charles L. Edgar, Russell Robb.

American Society of Mechanical Engineers: Ira N. Hollis, I. E. Moulthrop.

American Institute of Architects (Boston Chapter): C. Howard Walker.

National Electric Light Association (New England Section): S. Fred Smith.

New England Association of Gas Engineers: William A. Wood, N. W. Gifford.

New England Section of the Illuminating Engineering Society: J. S. Codman.

New England Street Railway Club: J. H. Neal.

New England Water Works Association: Leonard Metcalf.

North Eastern Section of the American Chemical Society: F. E. Gallagher.

Society of Chemical Industry: Hervey J. Skinner.

The Telephone Society of New England: F. P. Valentine.

After two meetings of the committee and a discussion of the subject, the plan which commends itself is the construction of a building for the Scientific and Engineering Societies of Boston similar to the United Engineering Building in New York. The building should be a modern, fireproof structure, located within easy reach of professional men having offices in Boston. A site between Copley Square and the Common has been suggested. A general outline of what the building should contain is as follows: The upper story to have space for a large library with separate alcoves for each society and ample facilities for consultation and reading; to contain also a social or lounging room, a billiard room, coat rooms, committee rooms and other conveniences. On other stories to be located rooms for the archives and meetings of executive officers of the scientific societies of Boston, these rooms to be fitted up with such special appointments as the work of the societies requires. In some part of the building to be a large auditorium for the meetings of societies. It has been suggested that this room may serve for the display of pictures and models, and that large dinners may be held here. The building to contain or to be connected with a first-class club, consisting of

1,000 resident and 500 non-resident members, made up of men in the scientific and engineering professions. If in a separate building, the club to be connected with the main building on one or more floors, so that a large banquet room in the club may be used by members of the societies without invading the club proper. It has been suggested that those portions of the building not taken by societies can be rented by architects, engineers and others, and also that certain parts of the lower stories could be rented for purely commercial purposes. To form some idea as to the possibility of carrying out the above project, letters have been addressed to the executive officers of a number of societies inquiring if their societies will rent space in such a building, providing satisfactory arrangements can be made for them.

**Rochester Engineering Society.**—At a meeting at the Chamber of Commerce, in the presence of 100 members of the society, Walter McCulloh, Consulting Engineer, State Water Supply Commission, gave an interesting address on Genesee River conditions. Mr. McCulloh was introduced by John Skinner, president of the society. The lecture was illustrated by stereopticon views of the river at different points and seasons and stages of flow. He said: "Any one of the plans of the Commission, if adopted, would make Rochester and the lower part of the Genesee Valley absolutely immune from floods and unduly high water. The cost would be considerable, of course. If Letchworth Park were left intact it might be necessary to spend \$8,000,000 for the dam and concomitant water power arrangements. The cost might be reduced by a couple of millions if another location were found for the dam and if the water power development were left to private enterprise."

**Central Electric Railway Association.**—Forty-seven electric railways, forming a network over Indiana, Ohio and Michigan, were represented at the session of the association in South Bend, Ind., on March 25, when over 150 officials and representatives of traction companies were present. The most important announcement was that limited passenger service between South Bend and Indianapolis would be inaugurated within the next six weeks.

**New England Railway Club.**—At the meeting of the club at the Somerset, Boston, March 24, Governor Aram J. Pothier of Rhode Island delivered an address. He declared that street railway patrons must receive adequate and comfortable trolley accommodations and that such means must be furnished, regardless of other considerations. With the exception of Governor Eben S. Draper of Massachusetts, who was unavoidably detained, and was represented by Lieutenant-Governor Louis A. Frothingham, every New England Governor was present. At the head table were Governor Pothier of Rhode Island, Governor Frank B. Weeks of Connecticut, Governor George H. Prouty of Vermont, Governor Henry B. Quinby of New Hampshire and Governor Bert M. Fernald of Maine. With the Governors were Congressmen Joseph T. Robinson of Arkansas, James F. Shaw, president of the American Street and Interurban Railway Association; P. F. Sullivan, president of the Boston & Northern and the Old Colony Street Railway Companies, and William A. Murphy, secretary of the Massachusetts Governor.

## Calendar of Meetings

April 6.

**American Society of Civil Engineers.**—Regular meeting, Society House, New York.—Charles Warren Hunt, Secretary, 220 W. 57th st., New York, N. Y.

April 13.

**New England Water Works Association.**—Special meeting, Allyn House, Hartford, Conn.—Willard Kent, Secretary, Narragansett Pier, R. I.

April 26-30.

**American Water Works Association.**—Thirtieth annual convention, Gruenwald Hotel, New Orleans, La.—J. M. Diven, Secretary, Charleston, S. C.

May 2-4.

**National Conference on City Planning.**—Second annual conference, Rochester, N. Y. Favel Shultz, Secretary, 19 Congress Street, Boston, Mass.

May 5-7.

**American Electrochemical Society.**—Annual Meeting, Pittsburgh, Pa.—Jos. W. Richards, Secretary, South Bethlehem, Pa.

May 6-7.

**Appalachian Engineering Association.**—Annual meeting, Winston-Salem, N. C.—Harry M. Payne, Secretary, Morgantown, W. Va.

May 17-19.

**National Fire Protection Association.**—Annual Meeting, Chicago, Ill.—Franklin H. Wentworth, Secretary, 87 Milk Street, Boston, Mass.

May 27-29.

**Louisiana State Firemen's Association.**—Fifth Annual Convention, Lafayette.—Wm. J. Kleinpeter, Secretary, Gretna, La.

June 1-4.

**Engineers' Society of Pennsylvania.**—Second Annual Convention, State House, Harrisburg, Pa.—Edward R. Dasher, Secretary.

June 21-23.

**Indiana Municipal League.**—Annual Convention, Richmond.—Baltz A. Bescher, Secretary, Richmond, Ind.

June 22.

**New England Water Works Association.**—June Outing, Providence, R. I.—Willard Kent, Secretary, Narragansett Pier, R. I.

August 23-26.

**International Association of Fire Engineers.**—Annual Convention, Syracuse, N. Y.—James McFall, Secretary, Roanoke, Va.

September 14-16.

**New England Water Works Association.**—Annual meeting, Rochester, N. Y.—Willard Kent, Secretary, Narragansett Pier, R. I.

October 11-16.

**American Society of Municipal Improvements.**—Seventeenth annual convention, Erie, Pa.—A. Prescott Folwell, Secretary, 239 W. 39th st., New York, N. Y.

## PERSONALS

ALLEN, PROF. JOHN R., Ann Arbor, Mich., professor of mechanical engineering at the University of Michigan, will head the engineering school to be established at Robert College, Constantinople. The money for the new school will be taken from the bequest of the late John Stewart Kennedy. Professor Alleen will go to Turkey early next summer.

BARRETT, DAVID, Chief of the Fire Department of South Omaha, Neb., died as the result of exertions at a fire at Swift & Company's packing plant, following a serious illness; he was 50 years old, and had seen 16 years' service in the department, 7 years as its head.

HOGAN, JAMES J., Torrington, Conn., Deputy Commissioner of the New York Street Cleaning Department, died as a result of exposure during the performance of his duties. Mr. Hogan was formerly Captain of the Yale football team.

LIPS, WALTER, Chief of the Los Angeles Fire Department, has resigned.

LOVE, JAMES M., Grafton, W. Va., has been elected Mayor over C. C. Lawson.

MARTIN, A. G., Fairmont, W. Va., has been elected Mayor.

MURPHY, W. H., Seattle, Wash., has been elected President of the Council.

RAY, ELLIOTT S., Pueblo, Col., has been chosen by Mayor A. L. Fugard as member of the Board of Trustees of the South Side Water Works, to succeed Andrew Park, deceased.

RICHARDS, HOWARD S., of New London, Conn., has been appointed resident engineer on a dam which the Amburson Hydraulic Construction Company, of Boston, is building at Eau Claire, Wis.

SCHAFFER, AMOS L., formerly division engineer in charge of sewer work in New York City for the Public Service Commission, First District, has been appointed Consulting Engineer of the Borough of The Bronx, succeeding Josiah A. Briggs, who ranked as Chief Engineer.

WARNOCK, T. A., Tacoma, Wash., who was Foreman of South Park until he resigned a few weeks ago, has been selected as Park Superintendent of the city for one year, at \$100 per month for the first 6 months and \$125 for the last. He succeeds J. H. Hadkinson, removed.

WYMAN, JAMES G., Pittsburgh, Pa., four times Mayor of Allegheny, died at his home on the North Side last week, aged 59 years.

Elections have been held in Iowa cities with the following results:

## Mayors of Iowa

Adair—S. H. Work.

Ames—Parley Sheldon over Henry Wilson.

Bacon—John P. McMurray over John Owens.

Burlington—W. W. Cross over Dr. J. S. Caster. Councilmen, H. P. Scowers, Frank Cowyn, Ernest Bock and C. P. Funk.

Calamus—F. A. Pleper, without opposition.

Carroll—Johnson, reelected without opposition.

Columbus Junction—D. S. Buffington over C. M. Fulton.

Council Bluffs—Thomas Maloney.

Clinton—J. C. Smith over M. B. Faiver and Dr. George Smith.

Cedar Rapids—M. J. Miles, re-elected over J. W. Barry.

Cresco—E. L. Davenport, re-elected over William Kellow.

Des Moines—Prof. Charles R. Hanna over Mayor A. J. Mathis (election contested); Councilmen: John MacVicar, reelected; Wesley Ash, reelected; Zell G. Roe over Councilman J. F. Hamery, and Charles Schramm, reelected.

Denison, W. H. Laub over Crisswell.

Dexter—S. K. Ellison over Allen P. Percy.

Farmington—J. G. R. Neff over T. S. Ross.

Eddyville—Phil Scott over W. S. Keller. Eldon—W. H. Enyart over Frank Shane. Eldora—Grant Tyler, reelected.

Grand Mound—W. R. Barber.

Harlan—Edmund Lockwood.

Hawarden—John H. Hutchinson over A. Ida Grove—C. S. Brannan.

Iowa Falls—B. B. Bryson, re-elected over W. W. White.

C. Wyant.

Lake City—J. M. Toliver over Hibbs.

Leon—James F. Harvey over Dr. O. W. Foxworthy.

Lost Nation—E. T. Hawes.

Marcus, Dan Miller.

Mediapolis—Dan Kelly.

Monticello—J. A. Voorhees.

Morning Sun—P. A. Yoke over Bert McKinley.

Mt. Vernon—Rev. Dr. E. T. Gruwell over George Wilson.

New London—A. D. Hayes over S. W. Hiles.

Onawa—K. A. Pullen over Henry Harlow.

Princeton—J. K. Pope over E. L. Slaughter and Dr. John Knox.

Sheldon, P. W. Hall.

Sibley—T. S. Redmond.

Sioux City—A. A. Smith, City Clerk for six years, was elected Mayor by 214 majority over E. P. Farr. G. B. Healy, Jonathan W. Brown, E. O. Wesley and R. S. Whitley were chosen Commissioners by substantial pluralities over their four opponents.

Spencer—H. Chamberlain over J. W. Hartman.

Valley Junction—J. S. Compton over M. J. Gray.

Villisca—E. C. Gibbs.

Waterloo—John R. Rector over P. J. Martin.

West Point—J. Dillman over D. Trevitt.

## TRADE NOTES

**Cast Iron Pipe.**—Chicago: A number of good-sized lettings are in sight. Quotations: 4-inch, \$28.50; 6 to 12-inch, \$27.50; 10-inch and up, \$26.50; Birmingham: Producers report that demand is active. Quotations: 4 to 6-inch, \$25; 8 to 12-inch, \$24; over 12-inch, average, \$23. New York: Volume of business is satisfactory. Quotations: 6-inch, \$25.50 to \$26.

**Lead.**—Market dull. New York: 4.425c to 4.5c. St. Louis: 4.20c to 4.25c.

**Lighting for Advertising.**—The object of the Atlantic City Lighting Company, chartered at Trenton by Camden capitalists the other day with a capital of \$125,000, was made known, when a communication was received in City Council submitting a proposition for lighting the Boardwalk by means of the most approved permanent standards, absolutely free of cost to the city. In return for lighting the Boardwalk the company, which is represented by R. W. Griswold, of Philadelphia, Pa., asks the privilege of placing small advertisements, claimed not to be conspicuous or unsightly, on a small glass, forming a part of the body of the standard. An ordinance has been prepared, calling for a twenty-year contract, and will likely be introduced at the next regular meeting of Council. In the meantime, Mr. Griswold has a sample of the standard in Marine Hall, on Atlantic avenue, and proposes to show it to all Councilmen, hotel men and citizens before the ordinance is introduced.

**World's Exhibition in Turin.**—According to Consul Albert H. Michelson, the Provincial Council of Turin, in association with certain sister Councils and with other bodies, proclaims, in connection with the World's Exhibition in Turin in 1911, an international competition for machines and processes which shall represent improvements over systems and methods now employed for maintenance of common roads of crushed stone or gravel. The Consul continues: "The promoters of the competition have already over \$8,000, and expect to bring it to \$12,000 for prizes. Any machine for road building, maintenance or repair, and any process for road improvement may compete. Prospective American competitors should apply (not later than July) for admission to the executive committee of the Exhibition of 1911 (Commissione Esecutiva per l'Esposizione Internazionale di Torino, 1911), either directly or through the International Exposition Bureau, 41 Union Square, New York City. This bureau officially represents the exhibition of 1911 in the United States and can furnish complete information regarding it. Complete information concerning road conditions in Italy, with especial reference to conditions in and about Turin, may be obtained from a report entitled "Construction, Repair and Administration of Roads in Italy and the Province of Piedmont," the manuscript copy of which is on file for public reference at the Bureau of Manufactures, where may also be seen the translated Italian rules and regulations governing the present competition.

**Auto Fire Engine.**—El Paso, Tex., has received its first auto fire engine from the Robinson Company, St. Louis, Mo. It carries a 35-gallon chemical tank, two extension ladders, small tools, and there are four Babcock hand extinguishers on the sides and rear, and a turret nozzle on the front.

## MUNICIPAL APPLIANCES

### Collapsible Steel Forms for Culverts

EXPERIENCE has shown that concrete culverts cost little more than the wooden culverts and bridges that they replace. Hence their increased use by road authorities. A collapsible steel form is made by the Miracle Pressed Stone Company, which operates on the same principle as the company's sewer mold. A rod with a right-hand screw at one end and left-hand screw at the other extends longitudinally through the center of the form. The steel shell is rolled so that when not under strain it is in a collapsed position. A hand wheel is fixed to one end of the longitudinal rod. A larger ring with toggle rods attached moves on the thread at each end. A few revolutions of the hand wheel spread the form out to its proper position. After the concrete is finished a few turns of the hand wheel, made easy by the tension of the steel, collapses the shell and permits withdrawal without damage to the finished work. The forms are made in any length, but 6, 8 and 10-foot lengths are standard.

In constructing a culvert, if a trench is dug, the earth itself serves as the wall; while, if above ground, as is frequently the case in constructing flumes, temporary forms of lumber or special forms of metal are erected to keep the concrete in place till sufficiently set. A floor of concrete is laid in the trench and the steel forms then placed in position (their weight being sufficient to



FINISHED CULVERT, MADE WITH MIRACLE FORM

this purpose. Where bends or curves are too sharp to be made with the 6-foot forms, a 2-foot or 3-foot section is furnished.

### New Boiler for Fire Engines

ASA W. LA FRANCE has invented a new combined fire and water tube boiler for steam fire engines, which is manufactured by the Combination Ladder Company, Providence, R. I. The object of the invention is to get a maximum amount of steam heating surface in a minimum amount of space, and the manufacturers claim that in this respect it is far in advance of all other types. The illustrations show a vertical section of boiler, Fig. 1; top of boiler directly under dome, showing fire tubes through which gases have to stack, Fig. 2, and the lower nest headers and connections through nipples and elbows to water leg of boiler.

Referring to the vertical section (Fig. 1), it will be seen that this boiler has the regular outer and inner shells, and that its prime distinguishing features consist in the unique form and arrangement of the nest headers whereby every water tube is directly exposed to the heat from the combustion chamber or fire box. Notwithstanding the very large number of these nests and tubes concentrated in so comparatively small an area, their shape (shown in Fig. 3) and arrangement give little or no obstruction to a strong upward draft, and no lodgment for cinders or soot accumulation that would otherwise foul the boiler. With normal water line the nests are entirely submerged, the circulation being from the lower connections (E) from water leg (J) upward through the water tubes and discharging through lateral openings in top header connections (F) a few inches above crown sheet and directly under baffle plate (G). This baffle plate prevents the water under violent agitation from rising too high and materially assists in keeping saturated steam from reaching the cylinders; in



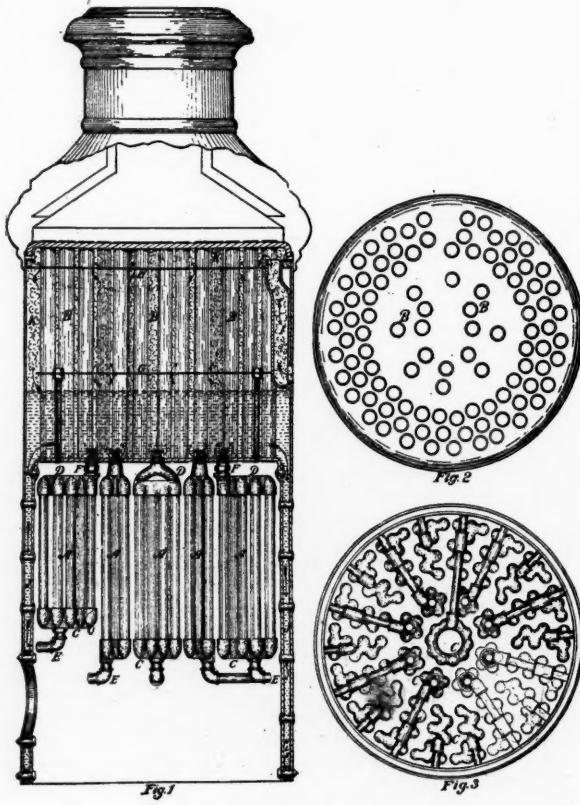
CONSTRUCTING CULVERT WITH MIRACLE FORM

give proper form to the soft material). The balance of the concrete is then put in very wet, agitating constantly, so as to remove air bubbles and fill all pockets and cavities. The top can be finished off flat or rounding to suit conditions. The thickness of the walls depends entirely upon the nature of the project. Under normal pressure, internal or external, satisfactory results can be obtained with 3-inch wall for 2-foot pipe, 4-inch wall for 3-foot, 6-inch wall for 4-foot, inside diameters. When subjected to unusual loads or pressure, the walls can be strengthened by increasing the thickness, or adding metal reinforcement. Standard expanded metal can be used or a heavy grade of woven wire fencing, both of which are manufactured extensively for

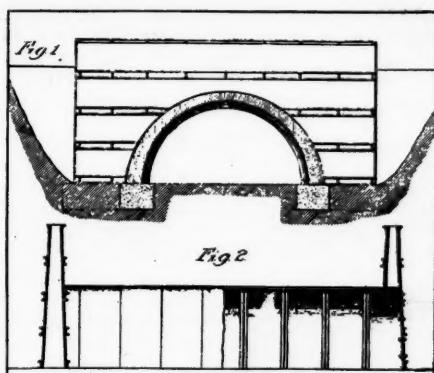
this connection also must be noted the diaphragm (H) dividing steam space (K) at top of boiler, and which acts as a superheater to further dry the steam before it enters the cylinders through steam take-off (I). The fire tubes (B) extend from crown sheet to top of head of boiler, passing through baffle plate (G) and diaphragm (H). The holes in diaphragm are a little larger than the fire tubes, leaving a passage for steam to what may be termed the upper steam space or chamber. Looking at upper section of boiler, here the water surrounds the fire tubes in direct contrast to the condition in the lower or nest tube section, where the fire surrounds the water tubes. This combination of well-known principles gives the boiler its name.

### Steel Forms for Bridges and Culverts

SECTIONAL steel forms for concrete culverts and bridges are made by the Illinois Concrete Machinery Company, Buda, Ill., for spans of 2½, 5, 10 and 15 feet and more in multiples of 5 feet. The 2½, 5 and 10-foot arches are semi-circular, while the 15-foot and larger spans are elliptical. The forms are made of sheet steel connected with channel and tee irons by means of 5-16-inch stove bolts. The sheets at retaining or end wall are connected by means of channel irons running the entire length of the wall, while the sheets over the arch are connected and supported by tee irons bent to the proper curves. The rigidity of the sheets themselves, together with the channels at the end walls and the tees under the arch, eliminate the need of any bracing whatever. This is a great advantage in the matter of safety from freshets. After the foundation on which the form is set is built there is little or no danger from high water. When the form is set it can be filled rapidly with wet concrete without danger of spreading, it is claimed. The manufacturers state that two ordinary



COMBINED FIRE AND WATER TUBE BOILER



SECTIONAL STEEL FORMS FOR BRIDGES AND CULVERTS

men in two days can set up a 15-foot span. The same form can be removed after the concrete has set by two men in a day. The steel forms can be used an indefinite number of times, whereas wooden forms will hardly stand setting up more than three times. As to weight, a 10-foot arch complete with end walls weighs but 5,970 pounds. The 15-foot span weighs 7,963 pounds. There is less weight to transport than there would be in the lumber, stakes, studing braces, etc., that are required for the forming in wood.

#### The Gasoline Tractor

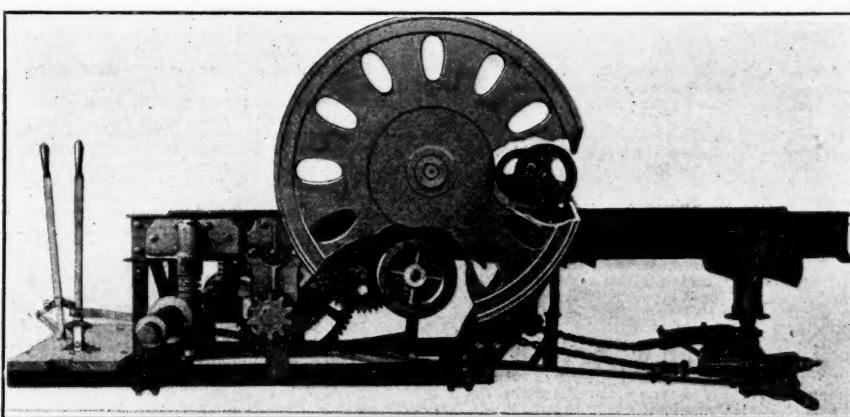
THE convenience, utility and general efficiency of the gas or gasoline engine are acknowledged, but owing to special principles in its power development it offers some very difficult and puzzling propositions for its successful application to traction engines, since it is absolutely necessary to run these tractors forward and backward, and it is very difficult to construct engines of this class to be reversed, and without which it will be necessary to use double sets of gearing, one to run forward and one to run backward. The problem has been met by the Ohio Tractor Company, Marion, O., in a very simple and satisfactory manner with a friction drive, which gives both forward and backward motion, without multiplication of parts, it requiring nothing extra to obtain both motions, using exactly the same number of parts to direct power one way, also to direct it in the other, wholly without complications of any kind, it is claimed, and even more simple than steam tractors are reversed. The friction gearing, it is stated, will transmit any amount of power required, or hold the engines, and will outwear the ordinary cog gearing. This friction drive is not to be compared with a fric-

tion clutch, as the clutch will slip until it grips, and when released it is off entirely. The device is suited to the purpose because the sudden shock of reversing is avoided by a moment's release of the parts during the change.

The principle adopted in the construction of the tractor permits the engine proper to constitute a unit within itself, and the truck a unit within itself, each being independent of the other, there being no part of gearing fastened or connected to any part of the engine. All gearing, axles and shafts are mounted on the channel frame of the truck, and the engine, with its bed, is then set into, and securely fastened to this channel frame, the bed of the engine resting its entire length on channels at each side, preventing it absolutely from shifting or becoming loose. The connection of power is completed through the friction drive applied to both sides or to both fly wheels at the same time, and alike. This prevents side draft, or uneven wear of bearings, and distributes wear and strains over a greater

alike, there being no gearing or clutches on engine shaft. The fly wheels are of special design, and can be taken off in a very few minutes, without drawing key, as a flanged hub is keyed solidly to the engine shaft, and the fly wheel is bolted to this hub. This allows removal of wheels, and shaft can then be lifted out should it be necessary; also gives free access to all lower gearing. Cylinder and heads of engine are water-jacketed and circulating pump forces a continuous stream of water through all parts affected by heat. The fuel, gasoline, kerosene or distillate is fed to engine with force pump, having return overflow piped back to tank. The carburetors are of special design, with large areas in all parts, both air and liquid, insuring good mixture before entering explosion chamber. The gearing, shafting, axles, etc., are of large proportion, and no claim is made of having a light machine with great power.

These machines are built in three sizes, and patterns have been nearly

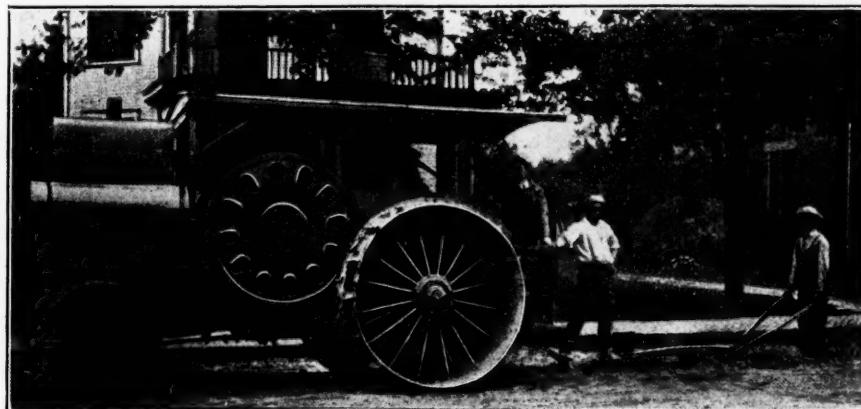


FRICTION REVERSING AND STEERING GEAR OF MOTOR TRACTOR

surface. The crank shaft is counterbalanced and has center bearing, all valves are mechanically operated, throttling governor, which can be set in an instant, to speed engine as desired. All parts are of large proportions, valves set in removable chambers, and may be taken out and reground without taking cylinders out, has auxiliary exhaust, and all parts are mounted on substantial bed, making it complete within itself; the bed is then set over and between the channel frame, resting its entire length, and is securely bolted thereto, preventing any uneven or out-of-line wear of engine bearings, which must take place where power is taken only from one side. The traction gearing power is taken from both fly wheels

completed for the fourth size, namely, 20, 30, 45 and 65-horsepower.

The second illustration shows the skeleton frame and gearing of the tractor, and arrangement of the friction drive and friction steering gear. The internal friction wheels are located and hung on pivot or eccentric bearings, between the hub and rim of fly wheels, and transmit the power from engine to traction engine gearing, they having a neutral position, and are brought in contact with the rim of fly wheel for forward motion, and against the hub of the fly wheel for the backward motion. Very little pressure against the lever on the operator's platform is sufficient to reverse the machine, as by the peculiar location and construction of these eccentric bearings, it becomes automatic in operation, and after friction surfaces are brought in touch with each other, it will of its own accord bring pressure sufficient to move its load. The greater the load, the heavier pressure it will produce. The internal friction also gives large contact of frictional surfaces, and is more durable than any other style of friction yet devised, as the frictional surfaces both travel in same direction, which is not the case in any external frictional surfaces. These friction wheels are made of tarred fibre board, and are guaranteed to outlast the ordinary gearing, and will transmit all the power of the engines. There being two of these wheels, one on each side, we obtain large friction area, preventing side draft and creating an even draw on all the shafts and bearings, consequently will not become out of alignment.



GASOLINE TRACTION ENGINE

## THE WEEK'S CONTRACT NEWS

**Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage  
Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Street Railways—Sanitation,  
Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards**

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we can not guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

### BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>STREET IMPROVEMENTS</b>				
New Hampshire	Concord	April 8, 1 p.m.	Constructing 3,850 ft. macadam road in Pembroke	Harry C. Hill, State Eng'r.
Indiana	Williamsport	April 8, 1 p.m.	Bldg. W. H. Allison et al. gravel road in Steuben twp.	Robt. L. Winks, County Auditor.
Indiana	Muncie	April 8, 10 a.m.	Constructing McCleary gravel road in Harrison twp.	Jos. E. Davis, County Auditor.
New York	Albany	April 8, 1 p.m.	Improving 19 State highways; total length, 62.98 miles.	S. Percy Hooker, Chm. Hwy. Comrs.
Ohio	Cincinnati	April 8, noon	Repair south fork Taylor Creek road, Green and Miami twps.	Fred Dreis, Clk. Co. Comrs.
Wisconsin	Two Rivers	April 8, 7:30 p.m.	Grading, curbing, macadamizing 3 blocks of Washington st.	Board of Public Works.
Indiana	Fowler	April 9, 1 p.m.	Constructing 4 gravel or stone roads.	Lemuel Shipman, County Auditor.
Indiana	Frankfort	April 9, 2 p.m.	Constructing 5 gravel roads, 36,190 ft. long.	C. F. Cromwell, County Auditor.
New York	Ft. Slocum	April 9	New macadam, 1,450 sq. yds.; resurface 1,200 sq. yds.; brick gutter, 5,600 sq. ft.; concrete curb, 200 lin. ft.	Capt. Peter Murray, Constr. Q. M. C. H. Rudolph, Chm. Bd. Comrs.
Dist. of Col'bria	Washington	April 9	Grading aggregating about 30,000 cu. yds.	G. N. Miller, City Engineer.
Washington	Ellensburg	April 11	Paving, etc., business section: 49,200 sq. yds. paving, 16,600 lin. ft. conc. curb, 2,000 sq. yds. conc. walks, 4,260 ft. 6-24-in. pipe sewers; 42 manholes, 1,200 lin. ft. 6 and 8-in. steel water mains.	Fred. C. Schneider, City Treasurer. John M. Murch, County Auditor.
New Jersey	New Brunswick	April 11	Paving 17,000 sq. yds. Eastern ave. with any suitable pavement.	John Coon, Com'r Sts. and Sewers.
Texas	Galveston	April 11	Grading, culverting, bulkheading, etc., road, Algoa to Co. line.	W. G. Owens, County Auditor.
West Virginia	Huntington	April 11, 2 p.m.	Grade, drain, curb, pave alley between 4th and 5th avenues, 10th and 11th streets.	F. W. Raymond, City Auditor.
Indiana	Bedford	April 11, 1 p.m.	Constructing 6,902 ft. gravel road in Shawswick twp.	W. F. Heal, City Clerk.
South Dakota	Aberdeen	April 11, 8 p.m.	Paving, etc., 4 sts., creo. block, brick and concrete.	E. G. Krahmer, County Auditor.
Saskatchewan	Moose Jaw	April 11, 8:30 p.m.	Paving 33,300 sq. yds.; combined curb and gutter, 13,500 lin. ft.; concrete sidewalk, 116,500 sq. ft. Angus Smith, City Eng.	S. Bruce, County Judge.
Minnesota	St. Paul	April 12, 10 a.m.	Grading and macadamizing Centerville road; cost, \$20,000; Lexington ave., \$11,000; Bald Eagle Lake ave., \$5,000.	Geo. Griffin, County Auditor.
Kentucky	Newcastle	April 12	Constructing 41 miles of turnpike roads.	David A. Jones, Clk. Bd. Pub. Serv.
Indiana	Noblesville	April 12, 1 p.m.	Constructing 7 gravel roads.	Forsyth County Comrs.
Ohio	Columbus	April 12	Brick, block or other material, number of sts., grading, etc.	C. W. Stuart, City Clerk.
North Carolina	Winston-Salem	April 12, 10 a.m.	Bldg. 5 miles macadam roads. J. L. Ludlow, C.E.	Geo. Cromwell, Boro. President.
Iowa	Clarinda	April 12, 7:30 p.m.	Concrete paving, 20,500 sq. yds. on 5-in. Portland cement conc.	Capt. F. T. Arnold, Constr. Q. M.
New York	New Br'ton, S. I.	April 12	Furn. and deliver: 45,000-gal. macadam road binder and 30,000-gal. liquid road oil, with asphalt as base; 30,000-gal. bituminous road surfacing material with tar as base and 41,000-gal. tar binder; 3,000 cu. yds. sand and gravel, 5 in. sand cushion.	F. T. Benoy, Chm. Bd. Pub. Wks.
New York	Ft. H. G. Wright	April 13	Macadam road, 1,700 lin. ft. concrete walks, 11,000 sq. yds.	Carl L. Hanson, Town Engineer.
Indiana	Ft. Wayne	April 14	Paving portions of 4 sts.; cement sidewalks, High st.	P. D. Hendershott, City Clerk.
Indiana	Connersville	April 14	Constructing 90,000 sq. ft. cement sidewalk, 5 ft. wide.	Board of Public Works.
Wisconsin	Platteville	April 14, 7:30 p.m.	Brick paving, 6,560 sq. yds., curb and gutter, 2 streets	A. B. Easterling, County Auditor.
New York	Little Falls	April 15	Paving North Ann street.	Clair A. Inskip, City Engineer.
Indiana	Kokomo	April 15, 2 p.m.	Constructing Dixon free gravel or stone road, Center twp.	L. C. Pollock, City Clerk.
Ohio	Bellefontaine	April 15, noon	Grading, curbing, macadamizing and paving Elm st.	Frank R. Lander, County Surveyor.
Oklahoma	Bartlesville	April 15	Bitulithic paving, 16,000 sq. yds.; concrete curb and gutter, etc.	C. R. Twiss, City Engineer.
Ohio	Cleveland	April 16	Grade, drain and improve Bradley road, Dover twp.	Geo. W. Armstrong, Sec'y Bd. P. W.
Mississippi	Vicksburg	April 18	Paving 36 blocks with asphalt, brick or other material.	C. N. McFarland, Chm. St. & Alley Commission.
Washington	Spokane	April 18	Paving and curbing Browns Addition, Imp. Dist. No. 675.	F. R. Lander, County Surveyor.
Missouri	Butler	April 19	Brick paving, 11,000 sq. yds. on 5-in. concrete base and 1 1-2 in. sand cushion.	H. K. Lindsey, County Surveyor.
Ohio	Cleveland	April 20	Grade, drain and improve 8,910 ft. road, Newburg Hts. village.	Fred Dreis, County Clerk.
Ohio	Columbus	April 20, noon	Grading and macadamizing No. Starr ave. road, 1.27 miles long.	J. C. Shefield, Chm. Bd. Bond Trus.
Ohio	Cincinnati	April 22	Improving Symmestown road, Symmes twp.; Spec. No. 973.	Hugh Lindsay, County Surveyor.
Florida	Lake City	April 25	Constructing 5 miles of cement sidewalks.	A. G. Carpenter, Pres. Co. Comrs.
Ohio	Columbus	April 25	Improving Henderson road, 24,000 lin. ft. to Perry twp. line.	P. A. Dignan, Bd. Pub. Wks.
Ohio	Xenia	April 25	Macadamizing 2 miles Jamestown-Bowersville pike.	S. L. Hanley, City Engineer.
Florida	Jacksonville	May 2, 3 p.m.	Laying sidewalks on 9 or more sts.; Philip Prioleau, City Engr.	Board of Public Works.
Montana	Havre	May 2	Grading and boulevarding 37,900 sq. ft. cement walks, 5 Imp. Dists.	
California	Long Beach	May 30	Paving Railway, American and Appleton streets.	
<b>SEWERAGE</b>				
Kentucky	Louisville	April 8, noon	Bldg. Brook st. sewer, Contract No. 62: 5,198 ft. 7.5 and 10-ft. rein. concrete sewer, inc. 5,000 cu. yds. concrete, 495,000 lbs. steel. Harrison P. Eddy, Boston, Mass., Cons. Engr.	P. L. Atherton, Chm. Sewer Comrs.
Ohio	New Lexington	April 9	Furn. material and building sewer system, tunnels, etc., in County Infirmary.	Geo. T. Drake, County Clerk.
Ohio	Lorain	April 9, noon	Bldg. Oberlin ave. storm sewer, also sewer in Ill. ave., etc.	L. B. Johnston, Clk. Bd. Pub. Serv.
Indiana	Evansville	April 9, 10 a.m.	Bldg. main sewer in Fourth ave., local in alley, Block 37.	Gordon B. Allis, Clk. Bd. Pub. Wks.
Kansas	Humboldt	April 11	Making complete survey of city to put in 25 miles of sewers.	J. E. Wakefield, City Clerk.
Iowa	Centerville	April 11	Furn. material and bldg. vit. pipe sanitary sewers, flush tanks, manholes, etc.	Thos. W. Miers, City Clerk.
Saskatchewan	Moose Jaw	April 11, 8:30 a.m.	Trenching and laying 7,100 ft. 10 and 12-in. sewer pipe.	W. F. Heal, City Clerk.
Florida	Kissimmee	April 12, 7:30 p.m.	Bldg. complete sewer and water systems. X. A. Kramer, Engr.	J. R. Gilbert, City Clerk.
Ohio	Columbus	April 12	Bldg. sewers in Sheridan st., Park and Eureka aves. and several alleys.	David A. Jones, Clk. Bd. Pub. Serv.
Illinois	Canton	April 14, 7 p.m.	Material and labor for bldg. system of storm water sewers, changes and additions to sanitary sewers and sewage purification tanks; \$30,000 bond. A. T. Maltby, C.E., Chicago.	Joseph Waugh, City Clerk.
Virginia	Big Stone Gap	April 15	Paving and sewer work to cost \$22,000.	City Recorder.
Kentucky	Louisville	April 15, noon	Contract 65: for 15th and 23d st. sewers, Comprehensive System.	J. B. F. Breed, Ch. Engr. Sewer Bd.
Ontario	Toronto	April 19, noon	Bldg. high level interceptor: 1,216 ft. 7.10x10 ft. diam. flattened shape; 2,246 ft. 9.6 ft. circular; 2,072 ft. 9.3 ft. and 1,336 ft. 9 ft.; 2,293 ft. 9.9 ft.; siphon crossing under River.	C. H. Rust, City Engineer.
Saskatchewan	North Battleford	April 19, 8 p.m.	Laying water and sewer mains, sewage disposal works, etc.	J. A. Foley, Mayor.
Ohio	Sebring	April 20	Bldg. sewage disposal plant. Holl & Starrett, Canton, Engrs.	Harry Jenkins, Village Clerk.
North Carolina	Reidsville	April 21	Bldg. sanitary sewer system: 10 miles 8 to 15-in. vit. pipe sewer; 3 sewage pumping stations; reduction tank. E. W. Myers, C.E., Greensboro; plans, \$5; \$2,000 cert. check with bid.	Francis Womack, Mayor.
Oklahoma	Enid	April 21, noon	Bldg. lateral sewer in 5 blocks in Garland addition.	E. R. Lee, City Clerk.
Alberta	Calgary	April 22, 4 p.m.	Furn. salt-glazed vit. clay sewer pipe, f. o. b. Calgary; also for 5 miles of sewers and 3 miles of water mains, city supply pipe.	H. E. Gillis, City Clerk.
New Jersey	Chatham	April 23, 3 p.m.	Bldg. 7 miles 8 to 15-in. vit. pipe sewers, Y branches, manholes, flush tanks, etc. Clyde Potts, 30 Church st., N. Y. City, Eng'r.	Frank L. Kelly, Mayor.
West Virginia	Huntington	April 25, 1 p.m.	Bldg. 12-in. lateral sewer between Wash. and Va. aves., 12th-14th streets.	John Coon, Comr. Sts. and Sewers.
Kansas	Leavenworth	April 26	Bldg. \$24,000 trunk system in Dist. 9.	J. H. Kirmeyer, City Clerk.
Pennsylvania	Pottsville	April 26, noon	Preliminary plans for Insane Asylum and sewage disposal plant.	Chas. T. Straughn, County Cont'l'r

## BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>SEWERAGE—Continued</b>				
Arkansas.....	Newport.....	April 27, 2 p.m.....	Bldg. 6 1-2 miles sanitary sewers and pump. station. Lund & Hill, Little Rock, Engrs.....	C. S. Henry, City Secretary.
Saskatchewan..	Weyburn.....	April 27, 8 p.m.....	Sewer pipe, disposal works, laying pipe; water works, etc.....	Willis Chipman, C.E., Toronto, Ont.
North Dakota..	Fargo.....	April 28, 5 p.m.....	Bldg. 12-in. sewer in Thirteenth st. North.....	N. C. Morgan, City Auditor.
Illinois.....	Danville.....	May 1.....	Constructing sewer in 2 additions; cost, \$70,000.....	Walter E. Winn, City Engineer.
Iowa.....	Hawarden.....	May 2.....	Bldg. \$20,000 sewer system; plans by K. C. Gaynor, Sioux City.	T. J. Reeves, City Clerk.
Kansas .....	Manhattan.....	May 3, 3 p.m.....	Bldg. complete sanitary sewer system; cost, \$80,000, inc.: pumping station, 1,624 ft. 24-in., 5,360 ft. 18-in., 5,200 ft. 15-in., 1,700 ft. 12-in., 67,000 ft. 8-in. pipe; 159 manholes; 23 flush tanks. Con M. Buck, City Engineer.....	A. W. Long, Mayor. Geo. M. Adair, Street Com'r.
New Jersey....	Perth Amboy....	May 21, 8:30 p.m....	Constructing 12-ft. sewer in Baker Place.....	
<b>WATER SUPPLY</b>				
New York.....	White Plains....	April 11, 8 p.m.....	Constructing a well: A—Steel strainer well in shop, approx. weight, 20,230 lbs.; B—Sinking well with concrete top and wooden well house.....	John M. Farley, Engr., 5 Court St. State Board of Administration.
Illinois.....	Kankakee.....	April 11.....	Bldg. steel tower and tank at State Hospital.....	John Caulfield, Sec'y Water Board.
Minnesota....	St. Paul.....	April 11, noon.....	Dredging west arm of Vadnais Lake, 7 miles from city; 1,500,000 cu. yds., mostly vegetation and peat.....	J. M. Murdock, Supt. Feeble Minded Institute.
Pennsylvania...	Lancaster.....	April 12.....	Furn. and install 6,000 ft. c. i. pipe, reinforced impounding reservoir.....	J. K. Gilbert, City Clerk. Benj. F. Guiney, Sec'y Water Bd.
Florida.....	Kissimmee.....	April 12, 7:30 p.m....	Bldg. complete water works and sewer system. X. A. Kramer, Magnolia, Mi-s., Engineer.....	H. S. Thompson, Comr. W. S. G. & E.
Michigan.....	Detroit.....	April 12.....	Furnishing 250 tons small and 20 tons large special castings.....	C. W. Stephenson, City Clerk.
New York....	Brooklyn.....	April 13.....	Furn. c. i. pipe, specials and valve box castings to Borough.....	Robt. S. Fedder, City Clerk.
Oklahoma....	Medford.....	April 13.....	Bldg. \$30,000 water works. Foster & O'Bannon, Joplin, Mo., Engrs.....	L. F. Dickson, Mayor.
Colorado.....	Fort Collins.....	April 14.....	Bldg. 5,000,000-gal. reservoir on Bingham Hill, with concrete sides and bottom and concrete or frame roof, etc.....	M. D. Lucas, City Clerk.
Alabama.....	Opelika.....	April 15.....	Furnishing water to city at expiration of existing contract.....	
South Carolina.	Florence.....	April 15.....	Bldg. 7 miles of water main; deep well pump (air lift system), c. i. pipe, hydrants and valves; cost, \$30,000. J. N. Johnson, Engineer.....	
Massachusetts..	Boston.....	April 15, 2:30 p.m....	Bldg. 6 ft. 4-in. pres. tunnel, 1,900 ft. long, concrete lining; laying 500 ft. 80-in. steel pipe, mortar lined, concrete cover; laying 930 ft. 60-in. c. i. pipe line in Newton; work includes 5,530 cu. yds. earth and 1,700 cu. yds. rock excav.; refilling 8,900 cu. yds.; curbing, 7,500 cu. yds. stone; 2,300 cu. yds. conc. masonry in tunnel, 500 in open trench, etc.....	
Washington....	Spokane.....	April 15, 2 p.m.....	Furn. 100,000 ft. 3-4-in., 15,000 ft. 1-in., 3,000 ft. 1 1/2-in., 2,000 ft. 2-in. galvanized soft iron pipe.....	Met. Water and Sewer Board.
South Carolina.	Florence.....	April 18.....	Extension to water works: lay pipe, take up old pipe, make con.; furn. c. i. pipe and specials; furn. hydrants, valves, boxes, etc.; air compressor or deep well pump, f. o. b. Florence.....	John Gifford, City Purch. Agent.
Ontario.....	Weston.....	April 18, 8 p.m.....	Bldg. pump house; mechanical water filters; electrically-operated machinery. Willis Chipman, C.E., Toronto.....	Wm. Hoffmeyer, Chm. Bd. Pub. Wks.
Saskatchewan..	No. Battleford...	April 19, 8 p.m.....	Pipe laying, water works and sewers; furn. water pipes, hydrants, valves, etc.; concrete reservoir; sewage disposal works. Willis Chipman, C.E., Toronto, Ont.....	T. H. Taylor, Town Clerk.
Pennsylvania...	Marietta.....	April 20, noon.....	Laying submarine line 2,200 ft. 10 in. universal c. i. pipe.....	J. H. Foley, Mayor.
Indiana.....	Blencoville.....	April 20.....	Bldg. reservoir and 8-in. c. i. pipe line; cost, \$22,000.....	Marietta Water Company.
Massachusetts.	Fall River.....	April 22.....	Furnishing 6,000,000 gal. high duty pumping engine.....	Louis Meyer, City Engineer.
Illinois.....	Aurora.....	April 22, 5 p.m.....	Drilling and casing deep well, 2,250 ft., 16 in. to 200 ft. depth, finish not less than 8 in. T. D. Stinson, Supt. Water Dept., Ont.....	Jas. J. Kirby, Clk. Water Board.
Alberta.....	Calgary.....	April 22, 4 p.m....	Laying 3 miles water mains and 5 miles sewer; city furnish pipe.	Board of Public Works.
Massachusetts..	Pt. Strong.....	April 23, 10 a.m....	Remodeling water distributing system at fort.....	H. E. Gillis, City Clerk.
Oregon.....	Hood River.....	April 25, 8 p.m....	Bldg. complete municipal water system in and near city.....	Capt. A. M. Miller, Constr. Q. M.
Saskatchewan..	Weyburn.....	April 27, 8 p.m....	Pump house, machinery, wooden stave pipe, mech. water filters, power house, lay pipes, etc. Willis Chipman, C.E., Toronto, Ont.....	P. M. Morse, City Engineer.
Louisiana.....	Breau Bridge....	May 3.....	Furn. 2,200 ft. 8-in. and 12,400 ft. 6-in. c. i. water main; 25 fire hydrants; thirteen 8-in. and ten 6-in. valves; two 200 h.p. boilers; 2 duplex pumps; 75,000-gal. tank and tower, 125 ft. high; 10-in. well. A. C. Jones, Opelousas, Engr.....	George Ross, Sec'y-Treas.
Tennessee....	Johnson City....	May 5.....	Constructing a water supply system.....	John Comeau, City Clerk.
Connecticut....	Waterbury....	May 20.....	Bldg. \$300,000 concrete dam in town of Morris.....	W. M. Dunlap, City Engineer. R. A. Cairns, City Engineer.
<b>BRIDGES</b>				
Massachusetts..	Hingham.....	April 8, 10 a.m.....	Alterations in hwy. and st. ry. bridge over Weymouth Back river, Lincoln street.....	Col. Edw. Burr, U. S. Engrs.
Indiana.....	Richmond.....	April 9.....	Bldg. steel bridge, concrete bridge and concrete culvert.....	Domas S. Coe, County Auditor.
Colorado.....	Denver.....	April 9, noon.....	Bldg. 2 steel bridges in Eagle and Ouray Counties.....	C. W. Comstock, State Engineer.
Alabama.....	Montgomery.....	April 11.....	Bldg. concrete bridge over Central of Ga. R. R. tracks on Madison avenue.....	A. R. Gilchrist, City Engineer.
Michigan.....	St. Joseph.....	April 11, 2 p.m.....	Bldg. superstructure for swing bridge over Morrison channel and Michigan Central Ry., at Main st. W. M. Hughes, C.E.....	M. Weber, City Clerk.
New York....	Syracuse.....	April 11, 1:30 p.m....	Bldg. concrete bridge over Onondaga Creek at Dickerson st.....	J. J. Halloran, Sec'y Bd. Con. & Sup.
Ontario.....	Scarborough.....	April 11, noon.....	Bldg. 70-ft. rein. concrete arch bridge over Rouge river.....	Barber & Young, 57 Adelaide st. E., Toronto.
Louisiana....	Shreveport.....	April 12, 5 p.m....	Bldg. \$300,000 steel traffic bridge over Red River.....	Geo. R. Wilson, City Engr.
South Carolina.	Newberry.....	April 13.....	Bldg. \$4,000 bridge over Saluda river.....	Newberry County Supervisors.
Ohio.....	Cincinnati.....	April 15, noon.....	Bldg. concrete bridge on new W. Chester road, Sycamore twp.....	Stanley Struble, Pres. Co. Comrs.
Pennsylvania...	Reading.....	April 15, 10 a.m....	Repairing Hartz Mill bridge, near Morgantown.....	A. L. Rhoads, County Controller.
Colorado.....	Denver.....	April 16.....	Bldg. steel bridge over Blue river 1 1/2 miles north of Dillon, Summit Co.....	Chas. W. Comstock, State Engr.
Maryland.....	Cumberland....	April 16.....	Bldg. steel and concrete bridge over Potomac river between Piedmont, W. Va., and Luke, Md.; bids on each span and for bridge as whole, with masonry, excav., etc. Address, Co. Court, Mineral Co., W. Va., or.....	Angus Ireland, Clk. to Rd. Directors.
Ohio.....	Cleveland.....	April 23, 11 a.m....	Bldg. 2 concrete culverts, E. Cleveland twp., per Reports 2385 and 2586.....	J. F. Goldenbogen, Clk. Co. Comrs.
Ohio.....	Columbus.....	April 25.....	Bldg. bridge over Alum Creek, Mifflin twp.; imp. Sand st. bridge.....	Hugh Lindsay, County Surveyor.
Louisiana....	Gretna.....	June 1.....	Constructing steel bridge over canal in Jefferson Parish.....	E. M. Hubert, Sec'y Police Jury.
Utah.....	White Rocks....	June 1.....	Bldg. substructure of \$18,000 steel bridge at Vintah and Ouray Indian agency. M. J. Patterson Contr. Co., Denver, Colo., has contract for superstructure.....	Com'r Indian Affairs, Wash., D. C
<b>LIGHTING AND POWER</b>				
Illinois.....	Olney.....	April 11.....	Lighting city streets.....	J. B. Porter, Chlm. Light Com.
Michigan.....	Sturgis.....	April 12.....	Vertical hydro elec., dir. con. unit. of 600 k.w. cap.; 600 k.w., a. c. exciter unit; hydraulic governor; 6 oil-cooled a. c. single phase, 60 cycle transformers, 2,300 to 23,000 volts k.w. cap. each; 3 panel switchboards, etc. G. S. Williams, Ann Arbor, Engr.....	M. E. Aulsbrook, Pres. Bd. Pub. Wks.
New York....	L. I. City, N. Y..	April 12, 11 a.m....	Furn. and install electric, combination and gas lighting fixtures in Queens County Court House.....	Lawrence Gresser, Boro. President

## BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>LIGHTING AND POWER—Continued</b>				
New York	Otisville	April 12, 10 a.m.	Bldg. elec. light and power plant, inc. engine, dynamo, generator, transformer, wiring, etc., for ground of Tuberculosis Sanatorium.	Board of Health, N. Y. City.
Oklahoma	Medford	April 13	Material, mach., etc., for exten. of water works and bldg. elec. tric light plant, cost \$30,000.	C. W. Stephenson, City Clerk. Capt. David L. Stone, Q. M.
Oklahoma	Ft. Sill	April 13, 10 a.m.	Electric Light and power plant and lighting at Fort.	
Maine	Rumford	April 14	Ledge excav. and masonry cradles for 1,000 ft. of 14-ft. penstock, relief pipe concrete spillway; mach. and bldg. excav. and conc. foundations; brick and concrete station bldg., etc.; 4,000 cu. yds. ledge excav.; 500 cu. yds. rubble masonry; 1,200 cu. yds. concrete; 112 cu. yds. brick work.	Rumford Falls Power Co. O. B. Olson, City Sec'y-Treas.
Alberta	Camrose	April 15	For installation of elec. light and power plant on 10-yr. franchise	L. F. Dickson, Mayor.
Alabama	Opelika	April 15	Furn. electric light to city at end of present contract.	C. G. Keyes, Clk. Co. Supervisors.
California	Los Angeles	April 18	Furn. and install engine and generator set at County Hospital.	
Indiana	Seymour	April 21	Lighting sts. and for exclusive franchise for establishing an electric light and power plant in city. McMears & Tripp, C.E.	John Havenschield, City Clerk. Constr. Q. M., U. S. Army.
Florida	Ft. Barrancas	April 22, 11 a.m.	Constructing electric lighting system at Fort.	
New York	Ft. Terry	April 30, 10 a.m.	Bldg. electric light and power plant and system; also minor alterations and for furn. and install new boiler in pump. plant.	Capt. F. T. Arnold, Constr. Q. M.
<b>MISCELLANEOUS</b>				
Indiana	Evansville	April 8	Sprinkling 25 streets from April 11 to Nov. 11, 1910.	Board of Public Works.
Ohio	Ashtabula	April 8	Bldg. 10 miles of electric railway.	Elec. St. Ry. Co., Haskell Bldg.
North Dakota	Wahpeton	April 11	Erecting City Hall. Eugene Schuler, Architect.	City Auditor.
Texas	Galveston	April 11	Raising bldgs. and other improvements in area covered by seawall improvement fill from 21st St. East.	John M. Murch, County Auditor.
California	Oakland	April 13, 11 a.m.	Furn. lead-enclosed saturated core cable for fire alarm and police telegraph dept.; cost, \$80,000; \$5,000 bond.	W. B. Fawcett, Sec'y Bd. Pub. Wks.
New York	West Point	April 15, noon	Constructing garbage crematory and building, complete.	Quartermaster U.S. Army.
California	Los Angeles	April 19	Furnishing 12,000 ft. 2 1-2-in. cotton fire hose.	City Clerk.
Wyoming	Cheyenne	April 19	Bldg. rein. concrete valve house 5 miles from city, inc. 38 tons structural steel, 745 cu. yds. concrete; 16 tons reinforcement.	C. C. Carlisle, City Engineer.
Brit. Columbia	Vancouver	April 21	Furn. 2 hose wagons, 2 chemical engines, 1 aerial ladder.	William McQueen, City Clerk.
Mississippi	Greenville	April 27	Bldg. new levees at Riverton and Shiloh, agg. 900,000 cu. yds.	Bd. Miss. Levee Comrs.
Georgia	Atlanta	April 29, 5 p.m.	Bldg. 200-ton crematory or two 100-ton plants.	G. H. Brandon, Sec'y Bd. Health.
Indiana	Fort Wayne	May 5, 10 a.m.	Bldg. public comfort station under sidewalk at Court House.	G. W. Lindemuth, County Auditor.
Massachusetts	Boston	May 15	Furnishing watering carts, also watering and oiling sts. in 10 districts of city; also for cleaning sts. and sidewalks in 4 districts, to Dec. 1, 1910.	G. C. Emerson, Supt. of Streets.

## STREET IMPROVEMENTS

**Capital Heights, Ala.**—City will pave three miles of sidewalks, lay cement curb and gutter.—J. S. Pinckard, Mayor.

**Gadsden, Ala.**—A petition has been prepared, asking that 4th st., between Locust and the L. & N. and the N. C. & St. L. freight depots be paved with brick.

**Mobile, Ala.**—Council is considering issuance of \$137,000 bonds for paving Broad st. with wood blocks.

**Eldorado, Ark.**—City has decided to pave streets in improvement district No. 2; cost, \$10,000.

**Little Rock, Ark.**—Superintendent of Public Works, E. A. Kingsley, has recommended following improvements: Scott st., with asphalt, cost, \$20,962; Rock st., with brick at cost of \$7,700; also portion of Rock st. with asphalt; cost \$25,000.

**Martinez, Cal.**—Board of Supervisors will call special election to vote on a bond issue for good roads; engineers are now ready to submit a report; it is the purpose to build a system of main highways extending through the entire county and also to construct the necessary bridges and culverts.—L. D. Dimum of Richmond, A. W. Maltby of Concord and R. L. McCabe of Byron, Committee.

**Merriose, Cal.**—East 14th st. is to be paved with asphalt; citizens favor macadam on account of cost.

**Oakland, Cal.**—Board of Public Works has referred to Council the question of widening of 14th st., between Alice and Jackson.

**San Jose, Cal.**—Council has decided to grade, pave and curb 1st, Julian, St. James and San Salvadore sts.; also lay cement sidewalks on Vine st.

**Stockton, Cal.**—Highway Commission has submitted to Supervisors specifications for grading French Camp, Acampo-Lockeford, Lodi-Woodbridge, Waterloo, Copperopolis, Mariposa, Linden, Farmington, West Side and Cherokee Lane.

**Vesalia, Cal.**—Citizens will vote April 18 on \$95,500 bonds to repair asphalt pavements and build bridges.—M. L. Weaver, Engineer.

**Willows, Cal.**—Supervisors at April session will award contract for building new road over San Hedrin route to connect with Mendocino road.

**Bridgeport, Conn.**—Residents of North ave. are urging oiling of that thoroughfare.

**East Hartford, Conn.**—Fire District has voted to construct sidewalks and curbs.

**New Haven, Conn.**—Extension of Edge-wood ave. is being considered.

**Torrington, Conn.**—Borough Board is considering street repairs.—H. I. Holcomb, Street Superintendent.

**Wilmington, Del.**—Council has agreed upon \$400,000 loan for street improvements during the next two years.

**Wilmington, Del.**—Residents of First, Fifth and Twelfth Wards are urging street improvements.

**Green Cove Springs, Fla.**—Town has sold \$45,000 street improvements, water works and electric light bonds to J. C. Edwards, city, for \$45,675.

**Inverness, Fla.**—Citrus County is considering \$100,000 bond issue for road improvements.

**Jacksonville, Fla.**—Board of Public Works will ask Council to consider \$100,000 bond issue for public improvements, including street paving.—Philip Prioleau, City Engineer.

**Madison, Fla.**—Madison county will vote on \$150,000 bonds for road construction.

**Atlanta, Ga.**—Work will begin at an early date on the construction of a macadamized boulevard between Atlanta and Decatur.—R. M. Clayton, City Engineer.

**Macon, Ga.**—Council will probably appoint committees to report on advisability of bond issue of \$250,000 for streets, and the same amount for sewers.

**Rome, Ga.**—City is considering \$250 bond issue for street paving and other improvements.

**Waycross, Ga.**—City is considering \$100,000 bond issue for street improvements and other improvements.

**Sandpoint, Ida.**—Council is considering \$13,000 bond issue for street repair work and other improvements.

**Benton, Ill.**—Plans have been prepared for the construction of 36,200 sq. yd. of vit. brick pavement on Portland cement foundation; work includes 21,650 lin. ft. of sandstone curb, concrete filler and 16,200 cu. yds. of excavation; estimated cost \$82,287.—L. L. Harper, Belleville, Ill., Engineer.

**Cairo, Ill.**—Sycamore and 8th sts. are to be improved; Commercial ave. may also be.—Mayor Parsons.

**Silvis, Ill.**—Village is considering extensive paving improvements.

**Waukegan, Ill.**—Improvement Board has passed resolution for paving of McAlister ave.; cost \$40,000.

**Evansville, Ind.**—Paving of West Illinois st. with brick is being considered.

**Franklin, Ind.**—County Commissioners are considering improvement of Murphy gravel road, in Hensley township, Johnson County.

**Marion, Ind.**—City will do considerable paving work this season.

**Mt. Vernon, Ind.**—Lynn Township is urging building of gap on Mt. Vernon and New Harmony road; length 1 1/4 miles.

**New Albany, Ind.**—Board of Public Works is considering building of mile or more of granitoid sidewalks.

**New Albany, Ind.**—Charles W. Appleby, City Engineer, has submitted estimates for improvement of Market st. to the Board of Public Works, to include vit. brick, asphalt, bitulithic and macadam improvement; property owners will select the kind.

**Princeton, Ind.**—County Engineer H. C. Morrison is preparing preliminary plans for corrugated galvanized iron culverts; bids will be received by the Board of Commis-

sioners of Gibson County about May 1.—W. T. Roberts, County Auditor.

**South Bend, Ind.**—Proposed plans for straightening of Marion st. between Leland ave. and Scott st. were presented to the Board of Public Works in a petition submitted by property owners and referred to the City Engineering Department.

**Corydon, Ia.**—Construction of rock road between this city and Bridgeport is being considered.

**Fort Dodge, Ia.**—Council has passed resolution ordering 54 more blocks of asphalt paving.

**Red Oak, Ia.**—Council is considering paving of about three miles of brick paving.

**Vinton, Ia.**—This city contemplates six blocks of brick or creosote block paving. Address City Clerk.

**Emporia, Kan.**—This city will pave three streets with asphaltic concrete.—Alva J. Smith, City Engineer.

**Independence, Kan.**—Bids will be advertised for paving West Maple and Locust sts.

**Manhattan, Kan.**—Highway Engineer Gearhart has prepared plans for grading and dragging Central Kansas-Colorado Blvd.

**Wichita, Kan.**—Nine miles of sand clay road will be built from the southern edge of the city south into the county.

**Covington, Ky.**—This city will pave with brick, macadam and asphalt portions of 10 streets.—H. G. Meiners, City Engineer.

**Middlesboro, Ky.**—City is considering paving of Pine and improvement of other streets.

**Baton Rouge, La.**—City will expend \$60,000 on paving; Council has ordered sidewalks on North blvd., on both sides to Dufrocq st.; directed the paving on the east side of Dufrocq, between North and North blvd.; ordered sidewalks on 3d st. for the entire length to be repaired, also on North blvd., between Capitol and the Executive Mansion.

**Colfax, La.**—Citizens will vote April 10 on bonds for roads and bridges.—J. W. Duncan, President, Police Jury.

**Baltimore, Md.**—Bids on Putty Hill portion of Belair rd. rejected as too high; low bid \$12,000 per mile. Address State Good Roads Committee.

**Baltimore, Md.**—Commissioners for Opening Streets are preparing to widen Harford Road.

**Billerica, Mass.**—Town has voted \$2,000 for building macadam highway.

**Boston, Mass.**—Grade of Berkeley st. from Boylston st. to Columbus ave. is to be lowered at cost of \$30,000.—Wm. Jackson, City Engineer.

**Framingham, Mass.**—State Highway Commissioners will expend about \$8,000 for paving Hollis st., and \$8,000 for Union ave.

**Haverhill, Mass.**—Mayor E. F. Moulton has had a petition prepared for the State Highway Commission recommending the extension of the State highway from Ward Hill to Andover, connecting the two ends

of macadam road so as to make a through State highway into Boston from this city.

**Lowell, Mass.**—Mayer Meehan has signed \$68,000 order for smooth paving.

**New Bedford, Mass.**—State Highway Commission has granted \$15,000 for repairing section of Taunton road in Lakeville.

**Jackson, Miss.**—The Board of Aldermen Newburyport, Mass. — Superintendent Johnston has recommended top dressing for streets; cost \$1,000; also purchase of road roller.

passed ordinances for paving certain streets aggregating about 45,000 sq. yds., kind of pavement not decided. E. H. Klyce, City Engineer.

**Butler, Mo.**—City will let the contract April 19 for 11,000 square yards brick paving; brick to be laid on concrete base five inches thick with sand cushion one and one-half inches thick.—C. N. McFarland, Chairman Street and Alley Commission.

**Lexington, Mo.**—The voters of Lexington have approved a direct Kansas City-Lexington rock road, and have voted \$120,000 bonds to build rock roads in the district.

**Kearney, Neb.**—Contract Committee has recommended that the bid for the construction of the road north of Shelton be rejected, as there was a mistake in the plans and specifications, which required a 48-ft. road when a 40-ft. road is desired, and the Clerk was instructed to advertise for bids for a 40-ft. road.—Address County Board of Supervisors.

**Lincoln, Neb.**—Bids will be received April 8 for paving with vit. brick in Paving Dist. No. 174 about 3,884 sq. yd.; also in Paving Dist. No. 14 about 9,000 sq. yd.—R. C. Ozman, City Clerk.

**Camden, N. J.**—Bids will be received April 13, 11 a. m., for \$67,000 road improvement bonds.—G. J. Bergen, 428 Market st., Solicitor, Board of Freeholders.

**East Orange, N. J.**—Chairman Joseph Lee of the Road Committee, and City Engineer F. A. Reimer are inspecting streets in other cities with a view to repaving streets to resist wear and remain dustless.

**Montclair, N. J.**—This city contemplates constructing about two miles of Tarvia teleford paving.—F. W. Crane, City Engineer.

**Morristown, N. J.**—Somerset County Board of Freeholders will construct 14½ miles of roads this year.

**Newark, N. J.**—Ordinances have passed Street and Water Board for constructing brick pavement on 6-in. concrete base on five streets, grading, curbing and flagging six streets and for sewers in five streets.—A. R. Denman, President.

**Artesia, N. M.**—The Town Board has just ordered in about two miles more of sidewalk.

**Albany, N. Y.**—This city contemplates paving, curbing, guttering and otherwise improving various streets; ordinances are pending.—Fred P. Bresler, Clerk.

**Cohoes, N. Y.**—This city contemplates brick paving in one street.—Geo. T. Bolton, City Engineer.

**Holley, N. Y.**—This village voted to appropriate \$250 for a road scraper.—Dr. John H. Taylor, Village President.

**Lawrence, L. I., N. Y.**—Taxpayers want good sidewalks; two-thirds of the property owners on Central ave., between Washington ave. and the Rockaway turnpike, have petitioned the Village Trustees to order the concreting of walks on both sides of street; walks will be a uniform width of 6 ft., with grass sod on the street side.

**Lockport, N. Y.**—City Engineer Frehsee has prepared plans and specifications for proposed 50-ft. pavement on Market st.

**Mt. Vernon, N. Y.**—The matter of widening First st. near West Lincoln ave. and covering the New Haven cut there is in charge of a special committee of five Aldermen.

**Rochester, N. Y.**—Bids on different kinds of pavements for Dewey st. are wanted by the Board of Contract and Supply.

**Rome, N. Y.**—Board of Public Works has approved plans and specifications of City Engineer Plunkett for the improvement of Stanwix st. from James st. to Floyd ave., and Floyd ave. from Stanwix st. to corporate limit line.

**Sag Harbor, L. I., N. Y.**—A party of surveyors from the State Highway Department, Albany, are staking and lining the grade for the five-mile stretch of stone road between Sag Harbor and East Hampton; work of actual construction will commence in April; the village has also appropriated \$2,000 for mile stretch of highway, to complete system of good road between the two villages.

**Salamanca, N. Y.**—This city will construct three-quarter mile of brick street paving.—C. C. Cheney, City Engineer.

**Whitesboro, N. Y.**—Village has voted \$30,450 to increase width of pavement to be laid on Main st.

**Mebane, N. C.**—The city contemplates expending \$15,000 in street improvement. Address the Mayor.

**Akron, O.**—The City Council passed an ordinance for paving Glenwood ave., from

Howard st. east to the corporation line; also for paving, widening and otherwise improving various streets.—W. A. Weygandt, Secretary Department of Public Service.

**Cincinnati, O.**—Council has decided to improve Whiteman and Livingstone sts. and sewer Montana ave.—E. O. Bathgate, Acting President.

**Cleveland, O.**—Twelve of \$15,000,000 will be the city's share of the cost of the elimination of every grade crossing in Cleveland, according to a rough estimate made by City Engineer Hoffman; the administration is confident the Mathews bill exempting grade crossing and street improvement bonds from the Longworth limitations will pass; the estimate may soon be needed in mapping out new work; it is probable the first group the city would take would be the series of Pennsylvania crossings from Central ave. S. E., to St. Clair ave. N. E., inclusive, which includes the East 55th st.-Euclid ave. crossing.

**Dayton, O.**—City Engineer F. J. Cellarius has submitted estimates, plans and profiles for the bulk of the city street paving jobs for the coming season to the Director of Public Service; paving Logan st., 6th to Brown, will cost \$3,655 by brick, and \$3,995 by asphalt; Johnson st., from Morton to Wayne ave., will cost, by brick paving \$12,445, by asphalt \$12,908; Closter st., from Wayne ave. to Fillmore, by brick \$13,351, by asphalt \$13,823; Burns ave., from Warren st. to Main, by brick \$4,962, by asphalt \$5,540; contracts will be let as soon as possible.

**Defiance, O.**—B. & O. Railroad is considering abolishment of grade crossings in city; \$250,000 will be expended.

**East Liverpool, O.**—This city contemplates brick paving in parts of 15 streets.—J. C. Kelly, City Engineer.

**Fostoria, O.**—This city contemplates paving with brick two streets; no legislation passed as yet.—W. O. Bulyer, City Engineer.

**Norwalk, O.**—Engineer Laylin has prepared plans for construction of Milan st. slag road.

**Ravenna, O.**—The City Council passed an ordinance for grading, draining, curbing and paving and relaying sidewalks on Bowery st., from Sycamore to Freedom st.—C. J. Hubbell, Mayor; E. W. Martin, Village Clerk.

**Oklahoma City, Okla.**—The City Council passed a resolution for paving portions of various streets.—Henry M. Scales, Mayor; Bob Parman, City Clerk.

**Shawnee, Okla.**—Council is considering construction of 15 miles of asphalt street paving.

**Eugene, Ore.**—Macadam road will be constructed a distance of three miles; \$6,500.

**Roseburg, Ore.**—Bids will be received May 2, by A. N. Druitt, City Recorder, for \$40,000 bonds for paving.

**Harrisburg, Pa.**—State Highway Department is now completing estimates on cost of three sections of road in Dauphin County.

**Pittsburgh, Pa.**—Fifteen streets will be paved with brick.—O. B. Higley, City Engineer.

**Memphis, Tenn.**—All streets leading to the new Union Depot will be improved.—E. H. Crump, Mayor.

**Morristown, Tenn.**—Hamblen and Hawkins counties are considering improvement of road from Morristown to Rogersville.

**Mountain View, Tenn.**—S. D. Newton, City Engineer, has prepared plans and maps for the grading and macadamizing of streets; Council will open bids at once and award contracts; plans at office of C. L. Mabry or Alderman Herbert S. Slattery at the East Tennessee Packing Co.

**Nashville, Tenn.**—The city will improve 21 suburban streets at an expenditure of \$200,000.

**Oblion, Tenn.**—Citizens have voted \$15,000 bonds for street and sidewalk improvements.

**Trenton, Tenn.**—Bonds for \$20,000 for graveling have been placed through the Sykes Banking Co. of Nashville with A. B. Leach & Co. of New York City; as soon as the sewerage, which is well under way, is completed the principal streets of the town will be gravelled.

**Winchester, Tenn.**—Franklin County has defeated proposed \$200,000 bond issue for road construction.

**Alice, Tex.**—Citizens will vote April 16 on \$5,000 bonds for street improvements.

**Amarillo, Tex.**—By a vote of approximately 14 to 1 Amarillo indorsed an issue of \$125,000 bonds for paving streets, extending sewers and establishing a substation.

**Bastrop, Tex.**—The county will expend several thousand dollars for road improvements. Address County Clerk.

**Dallas, Tex.**—Council has ordered laying

of sidewalks on San Jacinto st., Swiss ave., Corinth, Howard, Eakins sts., Ross ave., Camp, Lamar and Griffin sts., amounting to about \$4,000.

**Dallas, Tex.**—An inspection of the Dallas-Fort Worth pike has been completed and the County Engineers are now figuring in detail on contemplated improvements.

**Fort Worth, Tex.**—Extensive paving is to be done this year.

**Paris, Tex.**—City will sell \$60,000 street improvement bonds April 15.—W. H. McCulston, Mayor.

**San Antonio, Tex.**—Sixty-two property owners have been ordered to construct first-class cement walls, under resolution of Alderman C. C. Smith.

**Sherman, Tex.**—City Engineer Thurmond has been ordered to prepare an estimate of paving to be done; no particular kind will be specified in calling for bids, street railways must be ready for their paving by May 1.—Barney Kreager, City Secretary.

**Taylor, Tex.**—Precinct No. 4 of Williamson County voted \$200,000 bond issue for road improvements.

**Tyler, Tex.**—Streets and sidewalks are to be improved at once.—John H. Bonner, Mayor.

**Abingdon, Va.**—Bonds of \$600,000 will be issued for construction of pipe roads. Address County Clerk.

**Bradford, Va.**—City is considering \$50,000 bond issue for street improvements.

**Buchanan, Va.**—State Engineers William Palmer, of Wingina, and C. A. Mullen, of Petersburg, have begun to make the necessary survey of the road leading south from this place a part of the national highway; cost \$8,800.

**Lexington, Va.**—City is considering \$50,000 bond issue for street improvements.

**Lynchburg, Va.**—Bids will be received on 1,100 yds. of rubble paving and curbing.—John T. McKinney, National Exchange Bank Bldg., Chairman Brookville District Road Board.

**Lynchburg, Va.**—Main st., between Walnut and Buena Vista sts., will be improved; contract not let.—H. L. Shaner, City Engineer.

**Norton, Va.**—City has voted \$70,000 bonds for building and improving streets, the construction of a sewer system and the erection of a town hall. Address the Mayor.

**Petersburg, Va.**—Finance Committee will recommend \$40,000 appropriation for street and public improvements.

**Spokane, Wash.**—Board of Public Works has passed resolution authorizing paving of Sherman st. with granitoid, brick, asphalt or wood block; cost \$46,000.

**Webster, W. Va.**—Citizens have voted \$20,000 bond for street paving and sewer construction.

**Montreal, Que., Can.**—Plans have been submitted to Board of Control for building of boulevard; cost \$11,000,000.

## CONTRACTS AWARDED

**Attalla, Ala.**—Artificial stone sidewalk, 5,200 sq. yds., and 8,000 lin. ft. artificial stone combined curb and gutter, to West Construction Co., Chattanooga, Tenn., \$8,924.—Hill & Campbell, Gadsden, Engineers.

**Corey, Ala.**—Street improvements: Southern Bitulithic Co., 60,000 yds. grading, 15,000 lin. ft. curb and gutter, 8,000,000 sq. yds. sidewalk, 1½ mi. Bitulithic pavement, about \$90,000; to Dunn & Lallande Bros., 60,000 yds. grading, 8,000 sq. yd. sidewalk, 13,000 lin. ft. curb and gutter, about \$45,000; to Copeland & Inglis Brick Co., brick paving, about \$10,000; to Graves-Matthews Paving Co., tarvia macadam, about \$40,000.—Robt. Jennson, Jr., President, Corey Land Co.

**Dothan, Ala.**—Six miles of sidewalks, to Porter & Couch.

**Montgomery, Ala.**—County road improvements to W. H. Vaughn, \$40,998; average level 7½ in., \$1.39 per cu. yd.; gravel weighs 3000 lbs. per cu. yd. A. E. Perry, \$50,200; W. A. Neal & Son, Atlanta, \$42,634; D. P. Cook, \$51,712; Goodrich & Crinkley, Harriman, Tenn., \$1,232; J. F. Giddens, \$60,183, and A. T. Newell, \$60,240.—J. T. Bullock, County Engineer.

**San Francisco, Cal.**—Paving Francisco st., to A. E. Hennessey, \$2,250.

**Hartford, Conn.**—State road work: Town of Torrington, 21,330 lin. ft. gravel-telford on Norfolk Road, including seven 20-in., four 15-in., two 30-in., ten 24-in., one 12-in. and two 18-in. tile culverts, to Joseph Masetti, Torrington; \$1.20 per lin. ft. for gravel, \$1.70 for telford, 55c. per lin. ft. for cobble gutters. Other bidders were: A. Vito, Thompson, \$1.88, \$2.60, \$1.75, 60c.; Piereson Eng. & Cons. Co., Bristol, \$1.65, \$2.25, \$1.19, \$1.99, \$1.35, 40c. and 60c.; C. A. Rossi, Torrington, \$1.21, \$2.33, \$1.40, 46c. and 48c.

**Town of Tarlton, 3,750 lin. ft. graded road, including two 20-in., one 18-in. and three 15-in. tile culverts, to the Board of Selectmen of the town for \$11,600, with \$1.38 per lin. ft. extra for telford base and**

80c. per lin. ft. for railing; A. C. Sternberg & Son, West Hartford, submitted following figures: \$18,250, 60c. and \$1.

Town of Woodbury, Minortown Road, 5,965 lin. ft. of grading, including three 24-in., three 12-in., seven 15-in. and two 30-in. tile culverts, to Trumbull & Goodman, Litchfield, \$6,935 for grading, 80c. per lin. ft. for telford, \$1.40 per lin. ft. for rubble drain, \$4 per cu. yd. for wall. Pierson Engineering & Contracting Co., Bristol, submitted the following figures: \$8,220, 70c., 90c., \$6. Sherman Hill Road, 2,116 lin. ft. grading, including one 20-in. and one 24-in. tile culverts to Goodman & Trumbull, \$2,980 for grading, 80c. for telford, \$1.40 for rubble drain, 50c. for cobble gutter. Pierson Engineering & Contracting Co., \$4,500, 70c. 90c. and 75c. Roxbury Road, 3,550 lin. ft. grading, including one 15-in. tile and a reinforced concrete arch culvert, to B. D. Pierce, Jr., Co., Bridgeport, \$7,770 for grading, 65c. per lin. ft. for telford, 65c. per sq. yd. for rubble drain, 60c. per sq. yd. for cobble gutters. Other bidders were: Pierson Engineering & Contracting Co., Bristol, \$9,948, 70c., 90c. and 75c.; Goodman & Trumbull, Litchfield, \$7,988, 80c., \$1.40, 50c.

Town of Prospect, 2,104 lin. ft. grading, including one 15-in. and two 24-in. tile culverts to B. D. Pierce, Jr., Co., Bridgeport, \$3,500 for grading, 65c. per lin. ft. for telford, 65c. per sq. yd. for cobble gutters, \$4.25 per cu. yd. for masonry. Other bidders were: Edward McManus, Waterbury, \$4,500, \$2.25, 75c. and \$7; Donahue Bros., Middletown, \$5,247, 65c. and \$5; C. W. Tryon, Meriden, \$3,900, 60c., 55c. and \$5.

Town of Naugatuck, 596 lin. ft. grading, to B. D. Pierce, Jr., Co., \$1,200 for grading, 65c. per lin. ft. for telford, \$4.75 for masonry wall. Other bidders were: Donahue Bros., Middletown, \$1,847, 65c. and \$5; C. W. Tryon, \$1,200, 60c. and \$5.

Town of Haddam, eight sections of graded road on the Hartford and Saybrook Turnpike, total length, 12,457 lin. ft., including one 30-in., four 15-in., one 24-in., two 12-in. and two 18-in. tile culverts, to Pierson Engineering & Contracting Co., Bristol, \$10,455 for grading, 70c. per lin. ft. for telford and \$1 per lin. ft. for rubble drain. Other bidders were: A. Brazos & Sons, Middletown, \$17,400 and 60c.; Roger Kennedy, Middletown, \$18,625, \$1.20 and \$1.10.

**Miami, Fla.**—Bitulithic paving, 27,370 sq. yds., to S. Kaull.

**Brunswick, Ga.**—Paving Newcastle st., about 7,200 sq. yds., with brick and pitch filler, to Southern Paving Construction Co., Chattanooga, Tenn., at \$1.55 per sq. yd.

**Lincoln, Ill.**—Paving portions of N. Kickapoo, McLean and Clinton Sts. to A. D. Thompson, Peoria, \$28,487.

**Muncie, Ind.**—Paving with brick intersection of Main st. and Ohio ave., to John Gubbins, \$1.15 per sq. yd.

**Harlan, Ia.**—Lana Construction Co., city, paving, guttering and curbing of streets on the public square, one block each direction from the square, and 5th st. from Market st., to the Great Western and Rock Island depots, \$54,000.—J. P. Crick, Omaha, Neb., Supervising Engineer.

**Marion, Ia.**—Thirty thousand sq. yds. 4-in. brick block paving, 4-in. concrete foundation to Dearborn and Jackson, Cedar Rapids, \$1.58 per sq. yd.; 2700 cu. yds. excav., 40c.; Cedar Rapids Construction Co., \$48,483; M. Ford, \$48,810; resetting 500 ft. old curbing, to Concrete Construction Co., city, 25c.; setting 14,500 lin. ft., 24-in. x 6-in., and 2000 lin. ft., 24-in. x 6-in. curb, to same firm, 33 2-5c. and 34c.; L. D. Dennis, \$5,560. S. N. Parsons, City Engineer.

**Independence, Kan.**—Grading Holmes rd., from 85th st. to the Redbridge rd., 3½ miles, to Fern Bros., Kansas City, \$12,289; Coal Mine rd., in the Blue Valley, to City Farm at Leeds, 1¼ miles, to Randall & Hood, city, \$5,471.

**Salina, Kan.**—Paving 10th and Ash sts., Kansas Valley Paving Co., \$1.75 per yd. for asphalt concrete; curbing, to N. H. Lyons, city, 77c.

**Louisville, Ky.**—By Board of Public Works, for original vit. brick construction, aggregate \$76,000; average prices from 1c. to 1½c. lower than the contracts for similar work last year. To the Jefferson County Construction Co., Stratton av., 22d to 23d st. and Hill st., from 10th to 12th st., at \$1.82 a sq. yd. Staehler Co., Stratton ave., from 18th to 20th sts., Wilson ave., from 15th to Bell st., Hill st., from 9th to 10th st., 29th st., from Bank to Xavier st., Lydia st., from Hoertz to Texas st., Mulberry st., from Texas to Hoertz st., and Ash st., from Hickory to Texas st., at from \$1.79 to \$1.87 a sq. yd. G. W. Gosnell & Co., Mulberry st., from McHenry to Hoertz st., \$1.84 a sq. yd.

**Louisville, Ky.**—Paving: Four streets to Barber Asphalt Co., \$63,000; two streets to American Standard Asphalt Co., \$6,000; 3d ave. to S. S. Paxton Co., Richmond, Ind., \$32,000, and six streets to American Standard Asphalt Co., \$32,000.

**Louisville, Ky.**—Brick paving, L. R. Figg & Co., for 7th and Magazine sts.; G. W. Gosnell Co., 327 5th ave., Marshall and Walnut sts., at from \$1.59 to \$1.62 per sq. yd.

**Baltimore, Md.**—By State Roads Commission, eight contracts for 33½ miles of road in 10 counties, aggregate cost \$368,238; 5½ miles from Brooklyn to Glenburnie, to the B. F. Sweeten Co., \$50,910.76; \$4,938.75 for grading, \$38,131.06 for stone macadam and \$7,840.95 for bridging and draining. William M. Elder for \$66,610.90 for curbing, grading and paving with macadam and vit. brick about two miles of the Falls rd. north of the city limits; \$6,258 for grading, \$4,282.50 for curbing, \$9,727.30 for macadam, \$34,949.60 for vit. brick and \$2,559.90 for pitch surfacing. Kent County—Chester-town, Kennedyville rd., 4.5 miles, to Junata Paving Co., \$43,916.79; \$4,982.75 for grading, \$34,274.34 for stone macadam and \$4,959.70 for bridging and draining. Talbot County—Wye Mills rd., 6.40 miles, to William C. Evans for \$76,168.38; \$1,502 for grading, \$58,751.52 for stone macadam, and \$5,884.50 for bridges, culverts and draining. Caroline County—Greensboro rd., 4.07 miles, to Thomas J. Barrett, for \$40,044.30; of this sum \$2,576.70 was for grading, \$34,301.40 for stone macadam and \$3,816.20 for bridging and draining; Lewis Trice rd., 2.67 miles, to Holt Construction Co., for \$29,436.35; of this sum \$3,749.40 is for grading, \$21,870.75 for stone macadam and \$3,816.20 for bridging and draining; Ridgeville and Damascus rd. in Carroll, Frederick, Howard and Montgomery counties, 2.33 miles, to Ira G. Robinson, for \$20,228.40; of this sum \$4,259 is for grading, \$14,253.70 for stone macadam and \$1,715.70 for bridging and draining. Prince George's County—T. B. rd., near district line, 6.11 miles, to Peter F. Connally; this will be a gravel road.

**Syracuse, N. Y.**—Resurfacing and repairing asphalt streets, to Warner-Quinnan Asphalt Co., \$28,700.

**Toledo, O.**—By Board of Control, to C. H. Peters & Son, pave Valentine st. from Palme ave. to Brough st. with vit. brick, \$6,912.80; to the Ohio Paving Co., pave Orchard st. and Maumee ave., from Pleasant pl. to Prouty ave. with vit. brick, \$8,337.56, and to the Andrews Asphalt Co., repave Erie st. from Monroe to Adams with asphalt, \$10,476.56.

**Youngstown, O.**—Road improvements Rosemont Road, Jackson Township, 2½ miles long, to Kane & Cumiskey, \$14,091; ½ mile brick roadway, Glenwood Ave. extension, to Chambers & Heasley, \$10,837.

**Enid, Okla.**—Laying pavements, to Warner-Quinnan Co., \$2.40 on class B and \$2.10 on class A, Bermuda asphalt.

**Harrisburg, Pa.**—Paving Granite st., to Central Construction Co., \$1.53 per sq. yd.

**Woonsocket, R. I.**—Furnishing curbing, to A. Newell, Manchaug, Mass., \$1,705.75; concreting sidewalks, to O. P. French & Son's Co., \$830.

**Charleston, S. C.**—The Charleston Terminal Co., Concord st. with Belgian blocks.

**Morristown, Tenn.**—Road construction, Hamblen County, to Freeman Bros., Knoxville.

**Cleburne, Tex.**—Sherwood & Wagley, 2,000 sq. ft. cement sidewalks, North Anglin st.

## BIDS RECEIVED

**Elkhart, Ind.**—Resurfacing Second st. and Lexington ave.: Andrews Asphalt Paving Co., Hamilton, O., Trinidad asphalt, 94c. sq. yd. for resurfacing; 30c. lin. ft. for concrete curbing; 10c. lin. ft. for resetting stone curb; catch basins, \$40; manholes, \$40; sewer inlets, \$20; changing flush tanks, \$5; concrete where necessary to be used in filling in damaged portions of the foundation and for raising street approaches, \$4.20 cu. yd. Peter Bros., South Bend, Obispo asphalt, sq. yd. resurfacing, \$1.03; concrete curb, 30c.; resetting stone curb, 10c.; catch basins, \$20; manholes, \$25; sewer inlets, \$10; changing flush tanks, \$15; concrete, cu. yd., \$4. Hoosier Construction Co., Indianapolis, bitulithic, \$1.12 sq. yd. on entire surface, price to include everything.

**Lawrence, Kan.**—Berkeley st., to Gilmore; grading, 33c; paving, \$1.30; curbing, 29c.

Hancock, to Haskins & Ramsey; grading, 35c.; paving, \$1.32; curbing, 34c.

New York, to Gilmore; grading, 31c.; paving, \$1.31; concrete curbing to Olson, 29c.

Winthrop, to Haskins & Ramsey; grading, 31c.; paving, \$1.31; curbing, 29c.

New York, to Haskins & Ramsey; grading, 40c.; paving, \$1.30; curbing, 58c.

Pennsylvania, to Gilmore; grading, 31c.; paving, \$1.31; curbing, 29c.

Henry, to Haskins & Ramsey; grading, 35c.; paving, \$1.26; curbing, 54c.

New Jersey, to Haskins & Ramsey; grading, 35c.; paving, \$1.32; curbing, 34c.

Euclid, to Gilmore; grading, 31c.; paving, \$1.33; curbing, 29c.

Adams, to Haskins & Ramsey; grading, 35c.; paving, \$1.32; curbing, 34c.

Ontario, to Haskins & Ramsey; grading, 35c.; paving, \$1.32; concrete curbing to Fry, 55c.

Alley west of Kentucky, to Gilmore; grading, 35c.; paving, \$1.34.

Alley west of Tennessee, to Gilmore; grading, 35c.; paving, \$1.34.

Alabama, to Haskins & Ramsey; grading, 35c.; paving, \$1.32, \$1.26; concrete curbing to Fry, 50c.

**Michigan City, Ind.**—Construction of sidewalks in the city for year: J. E. Southard, cement, 7½c. per sq. ft.; brick, 8c. per sq. ft.; grading and filling, 25c. per cu. yd. Vincent Milcarek, cement, 78½c.; grading and filling, 17½c. George Towers & Co., cement, 8½c.; porter brick, 8c.; Roeske brick, 7c.; grading and filling, 25c. Swan Magnuson, cement, 90c. per sq. yd.; grading and filling, 18c.

**Salina, Kan.**—Paving 10th and Arch sts.; Barber Asphalt Co., sheet asphalt, \$1.95 per sq. yd.; excavating, 35c. per cu. yd. Kansas Bitulithic Co., bitulithic pavement on either concrete or bituminous base, \$2.15; excavating, 35c. Kaw Paving Co., asphalt concrete, \$1.75; sheet asphalt, \$1.93; excavating, 33c. John Ritchie, brick pavement, \$1.74; with grout filler, \$1.84; with asphalt filler, \$1.94; excavating, 33c. Haskins and Ramsey, asphalt concrete, \$1.55; excavating 35c.

Curbing bids—Kaw Paving Co., for curbing and guttering, 78c. per ft. L. H. Lyons, Salina, for curbing and guttering, 77c. per ft. J. S. McLaughlin & Son, Topeka, for curbing and guttering, 79c. per ft.

**South Amboy, N. J.**—Construction of sanitary sewers: Louis Jacques, Elizabeth, \$41,835.40; E. M. Mullen, Bayonne, \$35,871.90; John McNabb, Bound Brook, \$38,807; P. J. Monaghan, South Amboy, \$32,040.90; A. K. Hillpot, Red Bank, \$28,177.80; Centrell Construction Company, Philadelphia, \$24,374.20; The Henry Spinach Construction Company, Waterbury, Conn., \$37,229.20; Martin Hansen, Perth Amboy, \$36,617; McGovern Contracting Company, Trenton, \$39,894.50; Westmoreland Contracting Company, Greensburg, Pa., \$37,786.50; John Jensen, Perth Amboy, \$29,893; Collins & Gundrum, South Amboy, \$43,044.50; Lafferty & Weir, New York City, \$30,704.30; Daniel Donovan, Bayonne, \$40,197.30; Liddle & Pfeiffer, Perth Amboy, \$40,544.50; John Quinlan, South Amboy, \$42,790; Martin Murray, Bayonne, \$37,291; Edward F. Saxon & John S. Palmer, New York, \$30,891.

## SEWERAGE

**Athens, Ala.**—Citizens have voted \$3,500 bonds to extend sewerage system and remodel light plant.

**Mobile, Ala.**—Council will consider issuance of \$137,000 bonds for construction of storm sewer in Broad st.

**Talladega, Ala.**—City will extend sanitary sewer system on four streets; cost \$4,000; city will employ its labor.

**Fresno, Cal.**—Estimates will be prepared of cost of construction of storm-water sewer for downtown portions of city.

**Orland, Cal.**—Town Trustees have appointed committee, T. J. Hicks, chairman, to secure information concerning installation of sewer system.

**Atlanta, Ga.**—Road Commission and Sewer Committee have adopted report of Rudolph Hering in regard to laying intercepting sewers and construction of three disposal plants and two pumping stations.

**Macon, Ga.**—J. W. & A. D. Wilcox, 206 Grand Bldg., desire correspondence with manufacturers of septic tanks for sewage disposal in city of 5000 to 8000 population.

**Rome, Ga.**—Citizens are considering \$250,000 bond issue for extension of sewer system.

**Waycross, Ga.**—City is considering \$100,000 bond issue for extension of sewer system.

**Sandpoint, Ida.**—Plans and specifications for the city sewerage system have been received from Professor H. N. Ogden of Cornell University; two plans are given, one to make the outlet of the sewer in the Pend Oreille Lake, and one to carry it to the Pend Oreille River, just below the new county wagon bridge; the latter plan is advised, and will probably be accepted; the cost of the complete system will run close to \$120,000; construction will commence in the near future.

**Batavia, Ill.**—The Board of Local Improvements will advertise for bids at once for constructing sewers at the Mallory ave. and Morton st. sewer district, at a cost of \$1,698.40 and \$1,177.40, respectively.

**Canton, Ill.**—Council has passed an ordinance providing for issuance of \$10,000 additional sewer bonds.

**Greenville, Ill.**—City will soon construct sewerage system.

**Mt. Morris, Ill.**—Town Board of Trustees has passed ordinance for construction of sewer system.

**Gooding, Ind.**—Plans have been prepared for the construction of sewers at a cost of \$63,204; work includes 3,440 ft. of 18-in., 1,460 ft. of 15-in., 2,040 ft. of 12-in., 140 ft. of 10-in., and 17,965 ft. of 8-in.—Louis C. Kelsey, 402 Dooly Bldg., Salt Lake City, Utah, Engineer.

**Fort Wayne, Ind.**—Council has adopted resolution for establishment of main sewer in South Wayne.

**Caldwell, Kan.**—Bids will be asked in 30 days for construction of sewers; plans by Burns & McDonnell, Scarritt Bldg., Kansas City, Mo.

**Emporia, Kan.**—This city will construct three pipe sewers and one 6-ft. storm water sewer.—Alva J. Smith, City Engineer.

**Hutchinson, Kan.**—Monroe st. residents are urging establishment of sewer district.

**St. John, Kan.**—Bids will be asked for construction of sewers within about 30 days.—Burns & McDonnell, Kansas City, Mo., Engineers.

**Middleboro, Ky.**—City is considering construction of sewer on Virginia ave.

**Easton, Md.**—Messrs. Ulysses G. Ross, Edwin G. Cover, Bertram E. Whitman, Frank Ross and W. Mason Sheahan have petitioned Council for franchise to build sewerage system with disposal plant.

**Boston, Mass.**—Council has given final passage to order of \$300,000 for sewerage work.

**Holland, Mich.**—This city contemplates constructing pipe sewers in four streets.—H. A. Naberhins, City Engineer.

**Ironton, Mich.**—This city may construct 1,500 ft. of cement sewers.—J. M. Goldsworthy, City Engineer.

**Chatfield, Minn.**—This village contemplates constructing sewers this summer. Address Village Clerk.

**Minneapolis, Minn.**—Bids for sewer pipe will be readvertised, as Minneapolis Sewer Pipe Co., which submitted the bid of \$39,459, refuses to furnish pipe and forfeited \$500 guaranty.—Carl Istrup, Sewer Engineer.

**Rochester, Minn.**—This city contemplates constructing sanitary sewers in four streets.—Wm. C. Fraser, City Engineer.

**St. James, Minn.**—Council is considering construction of lateral sewers in southern and western part of city.

**Sedalia, Mo.**—Bids will soon be received for constructing about five miles of lateral sewers.—F. T. Leaming, City Engineer.

**Dunellen, N. J.**—Borough may join with Plainfield and North Plainfield in building sewer system and sewage plant.

**Hackensack, N. J.**—Board of Freeholders has decided to do away with 18 culverts and join with village of Ridgewood in construction of storm water sewer.

**Ontclair, N. J.**—This city contemplates constructing about 1½ miles of lateral sewers.—F. W. Crane, City Engineer.

**Newark, N. J.**—Ordinances have passed for constructing sewers in five streets; 18-in. sanitary sewer will be built in Elizabeth ave.—Wm. E. Greathead, Clerk Board of Street and Water Commissioners.

**Plainfield, N. J.**—Storm sewer will be built in Richmond st., between William and E. 2d st., completing sewer work on street.—C. J. Fisk, Mayor.

**Roosevelt, N. J.**—Council has finally passed ordinance providing for additional sewers in Carteret addition.

**Binghamton, N. Y.**—Sewer will be asked for to run from Chapin to Murray st. on Malden lane. Address Committee on Sewers and Sewage.

**Cohoes, N. Y.**—This city contemplates constructing two vit. pipe clay sewers.—Geo. T. Bolton, City Engineer.

**Hempstead, L. I., N. Y.**—A 40-acre farm south of this village has been purchased by a number of public spirited citizens, who intend to hold it until such time as the village shall become ready to build a sewerage disposal plant, when they will sell it to the village for exactly the cost to them. Address Carman R. Lush, former Village President.

**North Pelham, N. Y.**—The Sewer Commissioners will perfect plans for the North Pelham sewer and the erection of a disposal plant for the town; application to connect with the disposal plant in the city of Mount Vernon was not granted, and town is now to erect its own plant.

**Oswego, N. Y.**—City will ask Legislature for authority to issue \$150,000 bonds for construction of East and West side sewer systems.

**Syracuse, N. Y.**—City Engineer Henry C. Allen has completed estimates of the cost of two sewers as follows: 12-in. pipe sewer in Dudley st., \$700; 15-in. pipe sewer in Willis ave. and in Schuyler st., \$3,350.

**Watervliet, N. Y.**—City Engineer has recommended construction of trunk sewer.

**Westfield, N. Y.**—Proposed sewer system will cost about \$140,000; matter has not yet

been voted upon.—Clyde C. Hill, North East, Pa., Engineer; J. A. Riley, Village Clerk.

**Reidsville, N. C.**—City will construct sanitary sewer system including ten miles of vit. pipe sewer, three pumping stations and reduction tank.—E. W. Meyers, Greensboro, Engineer; Francis Womack, Mayor.

**Fargo, N. D.**—Council has adopted plans by City Engineer Crabbe for sewer extensions.

**Akron, O.**—The City Council passed an ordinance for issuing \$2,000 of 4½ per cent semi-annual bonds for constructing a main trunk sewer in Bowery st., between Rhodes ave. and Nathan st.—R. A. Myers, President; Dow W. Harter, Clerk; W. T. Sawyer, Mayor.

**Ashtrabula, O.**—This city will construct pipe sewers in portions of six streets.—Lewis A. Amsden, City Engineer.

**Bellefontaine, O.**—The City Council passed a resolution for constructing sewers, flush tanks, Y's and manholes on S. Main st., from Spring st. to the south corporation line.—Frank G. McCracken, President; J. R. Fawcett, Clerk; Lewis E. Pettit, Mayor.

**East Liverpool, O.**—Engineer George has prepared plans for a sewer from west side of Clark ave. and running eastward over the Nicholson property to the storm sewer; estimated cost \$2,268.20.

**Fostoria, O.**—This city contemplates constructing pipe sewers in three streets; no legislation passed as yet.—W. O. Bulyer, City Engineer.

**Hamilton, O.**—The City Council passed an ordinance for the construction of sanitary sewers in various streets. E. G. Ruder, President; H. B. Grevey, Clerk; A. Rothwell, Mayor.

**Marion, O.**—City Council has decided to construct sanitary sewer on Nunin st.

**Springfield, O.**—The City Council passed an ordinance to issue \$1,777 of 5 per cent semi-annual bonds for the construction of a sanitary sewer in Franklin st., from State st. to Southern ave., and a connecting sewer in Southern ave., from Plum st. to the Pennsylvania Railroad, in sewer district No. 16, Highlands District.—Albert Eglinger, President; Wm. H. Mahoney, Clerk; Chas. J. Bowlus, Mayor.

**Zanesville, O.**—Council is considering the issuance of bonds for the construction of sewers.

**Collinsville, Okla.**—Engineers M. A. Earl & Co., Flynn-Ames Bldg., Muskogee, Okla., are preparing plans for a system of sanitary sewers for Collinsville; to be paid by assessments, and size will be determined by the number of property owners signing petition.—W. J. Patterson, City Clerk.

**Muskogee, Okla.**—This city contemplates constructing a vit. pipe storm sewer this spring.—Charles Wheeler, Jr., City Clerk; E. A. Kemmler, Supervising Engineer.

**Yukon, Okla.**—Plans are being prepared for sewers and water works.—Burns & McDonnell, Scarritt Bldg., Kansas City, Mo., Engineers.

**Forest Grove, Ore.**—City Engineer Richardson is making preliminary surveys for a sewer system.

**Bradford, Pa.**—City Engineer B. A. Wise has submitted to Council plans for sewage disposal plant and intercepting sewers; cost, \$91,249.

**Pittsburg, Pa.**—Sanitary and storm water sewers will be constructed.—O. B. Higley, City Engineer.

**Weathery, Pa.**—City will soon construct a sewer system.

**Woonsocket, R. I.**—This city contemplates constructing about 2,000 ft. of 8-in. sewer.—Frank H. Mills, City Engineer.

**Columbia, S. C.**—The city will construct a concrete storm sewer on Taylor st. Address Secretary of the Board of Commissioners.

**Amarillo, Tex.**—Bonds for \$125,000 have been voted for extending sewers and streets and for establishing a subfire station.

**Belton, Tex.**—Citizens have raised \$7,500 for sanitary sewers, and will ultimately raise \$20,000 for purpose.

**Beeville, Tex.**—Citizens will vote April 12 on \$12,000 bonds for sewers.

**Commerce, Tex.**—Board of Trade has secured a franchise from city for a sewerage system to be constructed by a corporation headed by J. H. Whatley, J. H. Rush and F. M. Kemp, all of Greenville; as soon as a charter can be procured the company will begin the construction of an up-to-date sewerage system to cover the business section and a large part of the residence section of the city.

**Corpus Christi, Tex.**—T. J. Cahill will prepare plans for proposed sewer system.

**Webster, W. Va.**—Citizens have voted \$20,000 bonds for sewer construction and street paving.

**Sheboygan, W's.**—Board of Public Works has recommended that the intercepting sewer from Michigan ave. to the Sheboygan River along Franklin ave. and N. 4th st. be built this year.

## CONTRACTS AWARDED

**Corey, Ala.**—Storm and sanitary sewers to Sullivan & Long, Bessemer.—Robt. Jemison, Jr., President, Corey Land Co.

**Sedalia, Mo.**—Sanitary sewers and complete sewage disposal works, to Wm. F. Hall, Clinton, at \$38,623.60.

**Albany, N. Y.**—Concrete sewer, Western ave., and 12-in. vitr. stoneware pipe sewers, Manning blvd., Myrtle ave. and Putnam st., to John Doyle, 14 James st., \$15,418.

**Rochester, N. Y.**—By Board of Contract, for a sewer through Dewey ave. and other streets, to Brayer & Albaugh, at \$68,661.10; Humboldt and Marion and other streets, to William H. Sours, at \$21,027.

**Toledo, O.**—Sewer in Holbrook st., to T. J. Kelley, \$4,569.47.

**Portland, Ore.**—Construction of the north branch of Brooklyn sewer, to Paquet, Giebisch & Joplin, \$247,000.

**Dallas, Tex.**—Laying a storm sewer on East Side ave., between Haskell and Carroll rolls, to C. W. Olcott, \$3,738.75; other bids, F. H. Lancashire, \$4,321.65; Dallas Home Improvement Co., \$5,094.75.

**Ellensburg, Wash.**—Sewers, northeast section, to Edw. Belch, city.

## BIDS RECEIVED

**San Francisco.**—Sunset sewer, Metropolis Construction Co., lowest bidder, above \$170,000. Williams & Belser, highest bidders, \$210,000.

**Michigan City, Ind.**—Sewers: Willard Ave.—W. H. Bell & Co., Rectangular part, \$8.80 per lin. ft.; 54 in., \$5.02; 27 in., \$4.98; 24 in., \$4.98. J. E. Southard—Rectangular part, \$8.95 per lin. ft.; 46-in. pipe, \$5 per lin. ft.; 27-in. pipe, \$5; 24-in. pipe, \$5. Tryon St.—W. H. Bell & Co., 24-in. pipe, \$3.32 per lin. ft.; 20-in. pipe, \$2.35; 18-in. pipe, \$1.21; 15-in. pipe, \$1.06; 12-in. pipe, 63c. per lin. ft. J. E. Southard—24-in. pipe, \$2.16 per lin. ft.; 20-in. pipe, \$2.29; 18-in. pipe, \$2; 15-in. pipe, \$2; 12-in. pipe, \$1.86.

## WATER SUPPLY

**Helena, Ark.**—West Helena Company has been incorporated with \$100,000 capital stock to construct water, light and heating plant.—E. C. Horner, President.

**Searcy, Ark.**—City will spend \$81,000 for improving water and sewerage systems.

**Auburn, Cal.**—Auburn Chamber of Commerce is considering proposition of a water sterilization plant to prevent danger of possible impure water.

**Calexico, Cal.**—Installation of municipal water works system is being considered.

**Porterville, Cal.**—Water extensions, cost \$190,000, are being urged.

**Sacramento, Cal.**—Citizens have voted against issue of \$666,000 bonds for filtration plant and pumping station.—Prof. Charles Gilbert Hyde, University of California, Engineer.

**San Bernardino, Cal.**—Engineer W. L. Brown has prepared plans and estimates for reservoir on Reservoir Heights; cost about 30 cents per cu. yd.

**Grand Valley, Colo.**—Council has voted to take over the water and electric light franchises of company and will install municipal plant; cost about \$25,000.

**Kissimmee, Fla.**—Bonds of \$43,000 have been issued for the construction of water works and sewerage system.

**Lafayette, Ga.**—Citizens have voted \$28,000 bonds for construction of water works.

**Montezuma, Ga.**—City invites bids for construction of 100,000-gal. water tank; bonds will be voted.—J. A. Happ, Chairman Water Works Committee.

**Quitman, Ga.**—City has decided to construct steel tower and tank of capacity of 150,000 gallons.—J. D. Wilson, Mayor; H. S. Jaudon, Box 582, Savannah, Engineer.

**Rome, Ga.**—City is considering \$250,000 bond issue for extension of water mains.

**Waycross, Ga.**—City is considering \$100,000 bond issue for extension of water works, etc.

**Moline, Ill.**—Completion of fifth filter bed at cost of \$3,800 has been ordered by Council.

**Rockdale, Ill.**—Installation of water works system is being considered.

**Jeffersonville, Ind.**—The Jeffersonville Water Co., J. T. Moerman, will soon be ready for bids for improvements to its water works system.

**Marion, Ind.**—Residents of Jeffras ave. are urging extension of water system.

**Winfield, Ia.**—City is considering installation of water system.

**Cherokee, Kan.**—City has rejected all bids received for constructing concrete reservoir.—E. C. Hitchcock, Mayor.

**Russell, Kan.**—All bids were rejected for reinforced concrete dam; new bids will be asked in about two weeks.—Burns & McDonnell, Scarritt Bldg., Kansas City, Mo., Engineers.

**Houma, La.**—The city will construct a water works system.

**Holland, Mich.**—This city contemplates constructing about 3,000 ft. of 6-in. water pipe extension.—H. A. Naberhins, City Engineer.

**Shakopee, Minn.**—This city contemplates constructing sewers in districts Nos. 2, 3, 4 and 5, and the extension of water mains.—L. P. Wolff, 204-206 Essex Bldg., St. Paul, Consulting Engineer.

**Zumbro Falls, Minn.**—Citizens will vote on \$2,000 bonds for water extensions.

**Columbia, Mo.**—Council is considering \$125,000 bond issue for enlargement of Columbia City Water and Light plant.

**Louisiana, Mo.**—The Louisiana Water Works Co., main office American Water Works & Guarantee Co., H. F. Barnard, Purchasing Agent, Pittsburg, Pa., will reline settling basin at Louisiana with concrete or asphalt this spring.

**Fairbury, Neb.**—Plans and estimates are in progress for complete water works and lighting plant, for which \$135,000 bond election has been called.—C. H. Denney, Chairman of Committee; Burns & McDonnell, Kansas City, Mo., Engineers.

**Orleans, Neb.**—Citizens have voted to install water system.

**Newton, N. J.**—Town has decided to install water meters. Rutherford Tuttle will inspect various makes.

**Alexandria Bay, N. Y.**—This village contemplates water works and sewer extensions at a cost of about \$2,500.—J. S. Keeler, City Engineer.

**Cherry Creek, N. Y.**—Citizens has voted to install system of water works; cost \$25,000.

**Malone, N. Y.**—City will sell \$220,000 water works bonds.

**Manchester, N. Y.**—The Village Trustees have granted Jas. Bulger and Jas. Hosey, both of Manchester, and others, a franchise to construct water works.

**Niagara Falls, N. Y.**—Water commissioners will readvertise for bids for installing filtration system.

**Oswego, N. Y.**—Advisory Board, Albany, has decided to erect a 20-ft. dam on the Country Club site in this city, on which property the city holds an option; the Minetto dam is to be located to the north of the present dam on the property of the Minetto-Merriden Co. Address Mayor Fitzgibbons, City Attorney Cullen or Superintendent of Water Department Ormsby.

**Potsdam, N. Y.**—Standpipe will be erected.—G. A. Littell, Superintendent.

**Rochester, N. Y.**—The plan of City Engineer Fisher for extending the water main system this year provides for laying

22 miles of new mains, of which the city has pipe for 14 miles on hand; the total cost will be \$225,000; work will begin as soon as \$150,000 is provided, for which an ordinance has been introduced in Council.

**Yonkers, N. Y.**—Eight-inch water main running into Natural Sugar Refinery will be replaced by 12-in. mains. Address Mayor Warren.

**Concord, N. C.**—Gilbert C. White, Engineer, Durham, has prepared plans for water works; cost \$40,000.

**Coshocton, O.**—Council is planning reconstruction of water plant.

**Crooksville, O.**—Council is considering installation of water plant.

**Defiance, O.**—Council has authorized Board of Control to enter into a contract to prepare preliminary plans for municipal water works and electric light plant.—Chas. Behringer, Director Public Service.

**Delhi, O.**—The Delhi Water Works Co. has been incorporated; capital stock \$21,000; J. G. Westwater is interested.

**Franklin, O.**—Extension of water mains under river is being considered.

**Springfield, O.**—The Director of Public Service was authorized to spend \$3,000 in making extension to water mains.

**Waverly, O.**—Waverly has sold \$35,000 4 per cent water works improvements bonds to Well, Roth & Co., of Cincinnati, who bid a premium of \$94.50 for the entire issue.

**Youngstown, O.**—A preliminary survey has been made of the Milton Township site for the proposed reservoir for the city; it is planned to build the dam just south of the Trumbull County line at Pricetown.

**Lawton, Okla.**—Citizens will vote Apr. 26 on \$200,000 bonds for construction of 50-ft. dam on Medicine Creek and \$40,000 for water works extension.—Z. M. Scifres, City Engineer.

**Moore, Okla.**—City has voted \$15,000 bonds to construct a water works system.

**Pittsburg, Okla.**—The Pittsburg Water and Light Co. will build a water works system.

**Tulsa, Okla.**—This city has voted to issue \$100,000 of bonds for improvements and additions to the water works system.—B. H. Sands, Superintendent of Water Department; D. C. Fenstermaker, City Engineer.

**Yukon, Okla.**—Plans and specifications are in progress for water works and sewers.—Burns & McDonnell, Scarritt Bldg., Kansas City, Mo., Engineers.

**Hood River, Ore.**—Bids will be asked at once by the City Council for the construction of a municipal water works system; cost \$80,000.—J. P. Newell, Portland, Engineer.

**Coatesville, Pa.**—Borough favors sinking of artesian wells.

**Kingston, Pa.**—Spring Water Co. has asked for charter to supply town with water.

**Butler, S. D.**—City has decided to install water works system and sewers.

**Newport, Tenn.**—City has decided to sell its source of water supply to W. B. Robertson and J. P. Hedrick, who will construct gravity water system.

**Obion, Tenn.**—Citizens have voted \$30,000 bonds for water and electric light plants.

**Alice, Tex.**—Citizens will vote Apr. 16 on \$15,000 bonds for water works.

**Bartlett, Tex.**—Bonds of \$7,000 have been issued for the construction of a water works system. Address the Mayor.

**Bonham, Tex.**—Citizens have voted \$15,000 bonds for water works improvements.

**Brownwood, Tex.**—Bonds of \$20,000 have been approved for the extension of the water works.

**Greenville, Tex.**—The State Board of Education has waived option on \$20,000 water works and \$20,000 fire station bonds.

**Thornton, Tex.**—City is considering installation of water works system.

**Ephraim, Utah.**—Council has prepared plans to secure water works by carrying the water from the big spring to the present site of the power house; they will move the power house up the canyon about one mile to Majors flat; engineers estimate the cost will be \$20,000.

**Layton, Utah.**—Committee, M. H. Ellison, Chairman, has been appointed to investigate cost of installing water system.

**Park City, Utah.**—The taxpayers have voted in favor of bonding the city to the extent of \$50,000 to construct and maintain a water works system; water will be obtained from the Alliance tunnel.

**Salt Lake City, Utah.**—Water Works Commission is considering petition for water mains in 13th, East and other streets in the vicinity.

**Sandy, Utah.**—The Bear Canyon Pipe Line Co. of Draper has been granted an extension to its franchise by the County Commissioners, and pipe line will be continued from Draper to Sandy, to furnish several towns, including Riverton and Crescent, with spring water.

**Clendenin, W. Va.**—Clendenin Water & Light Co. will construct proposed water works; Engineer Venable, Charleston, in charge.

**Parkersburg, W. Va.**—City has adopted plan submitted by L. E. Smith for system of natural filtration to be located on Ohio River; plant will comprise system of per-

**Lebanon, Pa.**—Bids received March 25, for improving the distribution system: (1) 4800 cu. yds. of pipe trenches without classification; (2) 4800 cu. yds. backfilling; (3) 3721 lin. ft. 16-in. pipe laid complete exclusive of valves, specials, trenched and backfilling; (4) 14,000 ft. 12-in. pipe laid complete as above; (5) 3966 ft. 10-in. pipe laid complete as above; (6) 36 ft. 6-in. pipe laid complete as above; (8) 36 ft. 4-in. pipe laid complete as above; (9) 32,300 lbs. specials, including crosses, tees, etc.; (10) 7 16-in. gate valves laid complete; (11) 56 12-in. gate valves laid complete; (12) 19 10-in. gate valves laid complete; (13) 2 6-in. gate valves, blow-offs, laid complete; (14) 12 8-in. gate valves, furnished by the city, laid complete; (15) 20 6-in. gate valves, furnished by the city, laid complete; (16) 10 4-in. gate valves, furnished by the city, laid complete; (17) 11 16-in. cast iron valve boxes; (18) 77 12-in. and less cast iron valve boxes; (19) 6 air valves complete in place; (20) 16 connections fire hydrants complete.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Time Limit
W. F. Chisholm*	\$0.85	\$0.20	\$1.95	\$1.30	\$1.05	\$0.80	\$0.60	\$0.40	\$0.03	\$62.00	\$29.50	\$23.50	\$11.00	\$2.00	\$1.80	\$1.10	\$3.50	\$3.50	\$13.00	\$2.00	\$38,737.55	100 Days
Partridge & Slowe	.58	.12	2.24	1.31	.98	.72	.44	.27	.05	63.00	32.00	23.35	12.25	1.50	1.00	1.00	3.25	3.00	15.00	15.00	38,934.10	90 "
Antonio Cocco	1.00	.20	1.90	1.27	1.00	1.00	1.00	1.00	.04	62.30	31.70	26.00	14.00	3.00	2.00	1.50	5.00	5.00	15.00	6.00	39,426.20	90 "
B. F. Sweeten & Son	1.75	.15	2.20	1.55	.96	.85	.70	.60	.04	65.00	32.00	25.00	13.00	3.50	3.00	2.50	4.00	4.00	15.00	20.00	47,819.96	120 "
United Ice & Coal Co.	2.40	.10	1.90	1.30	.90	1.00	1.00	.05	70.00	40.00	35.00	20.00	8.00	6.00	5.00	20.00	20.00	15.00	25.00	48,513.30	125 "	
United States Construction Co.	2.00	.20	2.20	1.46	1.20	1.00	.89	.45	.04	62.00	27.50	23.00	10.00	2.00	1.50	1.00	6.00	4.00	14.00	15.00	48,518.64	150 "
Jno. I. Dick	2.45	.25	2.79	1.27	1.12	.95	.85	.45	.05	76.80	30.50	27.50	12.25	3.75	3.50	2.75	3.50	3.50	13.00	4.50	50,652.61	180 "
Jas. Ferry & Son	3.00	.25	2.05	1.40	1.05	1.50	1.40	1.30	.05	80.00	38.00	32.00	17.00	7.00	6.00	5.00	6.00	5.00	17.00	15.00	53,135.55	100 "
Hawman Bros.	1.00	.15	2.50	1.80	1.50	1.15	.75	.75	.03	66.00	32.00	27.50	14.00	2.65	2.15	7.35	23.25	15.00	8.00	56,779.40	200 "	
Weaver Const'n Co.	1.61	.40	3.28	2.00	1.75	.99	.78	.49	.03	75.00	48.00	30.00	15.00	5.00	4.00	10.00	7.50	24.00	5.50	62,937.74	250 "	

\*Awarded contract March 28, 1910.

†Last four items of this Proposal were not filled out; have been given an average value.

**Lebanon, Pa.**—Bids received March 25, for building new 20-inch main from dams to city: (1) 926 cu. yds. excav. through breast of Dam No. 1, inc. backfilling and shoring; (2) 100 cu. yds. excav. other than above, but exclusive of pipe trenches; (3) 15 cu. yds. concrete, casting intake tower, if built; (4) 45 cu. yds. concrete other than above for valve pits, cut off walls, etc.; (5) 110 sq. yds. replacing old stone on dam breast with concrete filling; (6) 84 ft. 6-in. c. i. pipe laid complete exclusive of valves and valve boxes; (7) 300 ft. 6-in. terra cotta pipe laid complete; (8) 15846 ft. 20-in. pipe, class A, laid complete, including trenching and backfilling; (9) 13764 ft. 20-in. pipe, class B, laid complete, as above; (10) 11008 lbs. specials, including Y's, tees, etc., complete in place; (11) 7 6-inch gate valves, not geared, in place; (12) 9 20-in. gate valves, geared, in place; (13) 7 iron pit covers in place complete with locks, etc.; (14) 16 air valves complete in place; (15) 21 cast iron valve boxes; (16) Erecting intake tower and bridge in place; (17) Tower house and slope steps complete; (18) 25 line markers.

NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total	Time Limit	
Jno. D. Kuhn*	\$1.00	\$0.60	\$9.00	\$6.00	\$0.30	\$0.80	\$0.45	\$2.70	\$3.00	\$0.03	\$14.00	\$133.00	\$22.00	\$17.00	\$4.00	\$90.00	\$650.00	\$6.00	\$87,810.68	125 Days	
W. G. Fritz & Bro.	.90	1.60	15.00	15.00	1.00	.75	.40	2.75	3.05	.04	12.00	120.00	7.00	20.00	3.00	50.00	450.00	1.00	89,314.42	120 "	
United Ice & Coal Co.	1.05	1.05	10.50	10.50	1.10	1.00	.50	2.74	3.11	.04	14.00	115.00	25.00	15.00	25.00	25.00	25.00	7.00	90,688.30	135 "	
United States Const'n Co.	1.00	1.00	8.50	8.50	1.00	.89	.35	2.87	3.10	.04	11.00	110.00	20.00	12.00	4.00	150.00	275.00	5.00	91,412.30	150 "	
Pitt Construction Co.	1.50	1.00	10.00	10.00	1.00	1.00	.50	2.84	3.13	.03	13.00	110.00	10.00	20.00	5.00	100.00	200.00	4.00	91,855.84	120 "	
Antonio Cocco	1.25	1.00	15.00	7.00	2.00	1.00	.70	2.99	3.32	.05	15.00	111.00	25.00	15.00	5.00	120.00	700.00	10.00	98,635.52	90 "	
Jas. Ferry & Son	1.50	2.00	12.00	11.00	1.00	1.00	.75	3.07	3.45	.06	19.00	14.00	20.00	20.00	8.00	7.00	400.00	800.00	9.00	101,764.30	150 "
M. O'Herron	1.50	1.50	12.00	12.00	2.00	.50	.60	3.33	3.64	.04	12.00	120.00	30.00	20.00	4.00	700.00	500.00	8.00	107,988.66	120 "	
B. P. Sweeten & Son	1.00	1.00	15.00	10.00	1.00	1.50	.50	3.41	4.11	.04	12.50	115.00	20.00	15.00	4.00	300.00	700.00	6.00	114,641.12	120 "	
Weaver Construction Co.	.90	1.30	10.00	8.00	1.30	.78	.30	3.58	4.00	.04	15.75	142.00	15.00	25.00	5.00	100.00	500.00	3.00	115,381.37	250 "	
Jno. I. Dick	1.60	2.40	14.50	12.00	3.70	1.85	.80	3.70	3.99	.05	12.00	126.00	2.75	13.00	3.70	125.00	485.00	2.75	118,250.16	180 "	
Hawman Bros.	1.05	.55	16.00	9.00	1.10	.87	.42	4.05	4.25	.03	13.75	115.00	26.50	15.00	7.00	73.25	80.00	4.50</td			

**Columbus, Kan.**—Following are bids received Mar. 21, for material for water works.—F. H. Hawkins, City Clerk.

NAME	Address	Price	PIPE		VALVES		Hydrants, 16	Specials
			6-in., 3,200'	4-in., 7,400'	6-in., 2	4-in., 4		
J. C. Barr Co.	Joplin, Mo.	\$7,868.50	\$0.857	\$0.655	\$14.50	\$11.55	\$24.50	\$0.041
J. Emington.	Columbus, Kan.	7,854.00	.70	.70	15.35	10.85	22.00	.03
Cook Const'n & Eng'g Co.	Des Moines, Ia.	7,600.00	.70	.55	16.00	12.00	24.00	.035
Yale & Ireland.	Coffeyville, Kan.	7,502.30	1.59	added	12.00	10.00	30.00	.0375
F. N. Fisher.	Columbus, Kan.	7,297.00	.93 $\frac{1}{2}$	.46 $\frac{1}{2}$	15.70	12.35	27.00	.05
O'Bannon & Foster.	Coffeyville, Kan.	7,192.80	.70	.60	15.70	12.35	27.00	.05
Freeborn Eng. & Con. Co.	Kan. City, Mo.	6,600.70	.67	.54	13.00	13.00	26.00	.035
Fred Deiter.	Joplin, Mo.	6,347.90	.63	.49	16.00	15.00	26.00	.03
T. G. Brooks & Son's Co.	Jackson, Mich.	6,078.00	.642	.48	13.50	9.50	25.00	.05
R. D. Wood & Co.	Phila., Pa.						24.00	
United States Cast Iron Pipe & Foundry Co.	Chicago, Ill.	{ 28.70	31.00	per ton per ton	14.55	11.10		.03
Chapman Valve Mfg. Co.	St. Louis, Mo.							

forated pipes laid horizontally in bed of river in bar and directly connected to intake at pumping station; cost, \$100,612.47.

**Birchwood, Wis.**—Wisconsin Light & Power Co. will construct roller concrete dam.

#### CONTRACTS AWARDED

**Sabetha, Kan.**—Ten miles of water mains, to T. C. Brooks & Sons Co., Jackson, Mich.; hydrants and valves, to Western Valve Co., Kansas City, Mo.; steel tower and tank, to Des Moines Bridge and Iron Co., Des Moines, Ia.; reinforced concrete reservoir, to Mr. Stimpson, city.

**Wakefield, Kan.**—Water works to Fred M. Clark, Savannah, Mo., \$14,300.—Burns & McDonnell, Kansas City, Engineers.

**Vinal Haven, Me.**—Furnishing all materials and constructing complete water system, Vinal Haven Water Co., to C. N. Taylor, Wellesley, Mass.; system will consist of four miles of 6, 8 and 10-in. c-i. pipe, steel standpipe 25 ft. in diameter by 85 ft. high, and duplicate pumping machinery.

**Boston, Mass.**—Meters: Hersey Mfg. Co., city, \$3,350 for \$35,035; Pittsburgh Meter Co., East Pittsburgh, Pa., bid \$32,735.

**Renville, Minn.**—Construction of steel water tower, to Rowat & Bennett, \$2,875.

**Lebanon, Pa.**—Building 20-in. main from dams to city, 15,486 ft. class A, 13,764 ft. class B, etc., John D. Kuhn, \$87,810.68; improving distribution system, 14,000 ft. 12 in., 3,966 ft. 10-in. pipe, etc., W. F. Chisholm, \$38,737.55.

**Franklin, Tenn.**—Extension to the water works and sewerage systems, to J. W. Worthington, president of Sheffield Cast Iron Pipe & Foundry Co., Sheffield, Ala.; cost about \$35,000. Granberry Jackson, Mt. Pleasant, Engineer.

**Dallas, Tex.**—Sinking four wells 1,500 ft. or deeper, to the Paluxy sands, R. H. Dearing & Son, maximum cost \$37,500 for 6,000 ft. or deeper; if shallower, \$6.25 per lin. ft.; 10-in. size to Woodbine stratum and 8-in. to Paluxy stratum.

**Ennis, Tex.**—L. B. Denham, to drill artesian well.

**Salt Lake City, Utah.**—Dredge for water works, to Marion Steam Shovel Co., \$75,000, delivered in Salt Lake City in 75 days; the Silver Iron Works Co., bid \$7,645.

**Milwaukee, Wis.**—Laying water mains, to Michael O'Donnell, 1215½ Clybourn st., as follows: 4-in., 34c. per lin. ft.; 6-in., 32c.; 8-in., 37½c.; 12-in., 53c.; and 16-in., 68c.

#### BIDS RECEIVED

**Palo Alto, Cal.**—Construction of water tower: Rickert-Ehrhardt Construction Co., concrete tower, \$7,998; Des Moines Bridge & Iron Co., five bids on steel tower, varying from \$6,925 to \$10,400, according to style of tank, with extra charge for excavation; Chicago Bridge & Iron Works, steel tower, \$7,000 and \$10,000, foundation to be prepared by city; Continental Fire Proofing Co., San Francisco, \$12,900; Nott & Monzingo, of Palo Alto, concrete tower, \$6,766 and \$9,068; Standard Engineering Co., concrete tower, five bids, varying from \$5,695 to \$9,100; Hazlewood & Doane, of Palo Alto, concrete tower, \$6,600, according to own plans; Keating & Son, of Palo Alto, concrete tower, three bids, ranging from \$6,396 to \$7,850, each bid subject to various modifications.

#### LIGHTING AND POWER

**Alexander City, Ala.**—Russell Manufacturing Co. is considering purchase of water power on Big Sandy Creek and proposes to transmit electricity to Alexander City; distance 11 miles.

**Athens, Ala.**—Citizens have voted \$3,500 bonds for remodeling light plant and extending sewerage system.

**Corning, Ark.**—Southern Ice & Power Co. has been incorporated with \$10,000 capital stock; Geo. A. Booser, President.

**San Diego, Cal.**—San Diego Gas & Electric Co. has decided to make extensive im-

provements and extension to plant; cost, \$1,000,000. C. E. Goesbeck, president and manager.

**West Seaford, Del.**—The South Delaware Gas Co. has secured the refusal of a lot in West Seaford, upon which they will shortly begin the erection of a gas plant.

**Brunswick, Ga.**—The Mutual Light and Water Co. is about ready to put down a 6-in. gas main to supply the southern end of the city.

**Lafayette, Ga.**—Citizens have voted \$12,000 bonds for construction of electric light plant.

**Rome, Ga.**—Rome Railway & Light Co. will expend about \$35,000 in improvements, including installation of 1,000-h.p. turbine in power house. S. S. Bush, Louisville, Ky., General Manager.

**Vollmer, Ida.**—Craig Mountain Light and Power Co. will develop power plant on Lawyers' Canyon Creek; capital, \$50,000. W. L. Lyons, W. J. Famey and others, promoters.

**New Albany, Ind.**—Board of Public Works is discussing matter of awarding the street lighting contract for a term of 10 years from next September.—Charles Troup, City Clerk.

**Fort Scott, Kan.**—W. C. Gunn will ask Moran City Council for gas franchise.

**Fort Scott, Kan.**—Gas & Electric Co. is planning to install power house.

**Kansas City, Kan.**—Permission has been given by Council for the Board of Park Commissioners to install 30 gas lights on the boulevard on 4th st., from Minnesota ave. to Washington blvd. in that city; the lights will be 100 ft. apart.

**Salina, Kan.**—Council has granted C. H. Randle 20-year gas franchise.

**Baltimore, Md.**—F. P. Stearns and J. R. Freeman, Consulting Engineers, have submitted their report on the new water works to Mayor J. Barry Mahool. They approve the Gunpowder location of the new reservoir; they estimate the cost of the site and reservoir at \$6,630,000 and the filtration plant at \$2,599,000.

**Holyoke, Mass.**—Plans are being considered for improving the lighting of High, Dwight and Main sts., and a conference will be held among the special committee of the Holyoke Business Men's Association, the members of the Board of Public Works and Manager W. F. Snow, of the Gas and Electric Department; an arrangement will be secured for additional street lights, even if no great white way is possible.

**Ironwood, Mich.**—The Ironwood Gas Co. will lay 8 miles of gas mains this spring.—M. Huiswisch, Manager.

**Owatonna, Minn.**—Engineer F. J. Millar, St. Paul, has estimated cost of installing municipal lighting plant at \$60,000.

**Kansas City, Mo.**—Union ave. business men are urging illumination of that thoroughfare; tungsten lamps favored.

**Libby, Mont.**—Citizens will vote Apr. 11 on granting franchise to Libby Telephone Co.

**Fairbury, Neb.**—Plans and estimates are being prepared by Burns & McDonnell, Scarritt Bldg., Kansas City, Mo., for lighting plans and water works to cost \$135,000; bond election has been called.—C. H. Denney, Chairman of Committee.

**Atlantic City, N. J.**—Atlantic City Lighting Co. has submitted to Council proposition for lighting boardwalk free of cost to city.

**Clifton Springs, N. Y.**—Citizens have voted \$4,000 bonds to enlarge municipal electric light plant.

**Lockport, N. Y.**—Lockport Light, Heat & Power Co. has submitted proposition to Council for lighting of Main st. and West ave.

**Elizabeth City, N. C.**—Mr. Boast, a representative of a gas company of Baltimore, is here for the purpose of inducing the Aldermen to renew the franchise so a plant can be built. The matter will be acted upon at the next meeting of the Board of Aldermen.

**Wilson, N. C.**—Board of Aldermen has

granted franchise to W. L. Baile, W. L. Lamredin and Garland Reed, Norfolk, to manufacture and distribute gas for light, heat and power; also right to operate a gas plant.

**Hamilton, O.**—City will soon ask for bids for furnishing supply of gas for 10 years.

**North Baltimore, O.**—City is considering installation of municipal light plant.

**Bandon, Ore.**—Bandon Light and Power Co. will improve plant and extend lighting system.—A. S. Elliott, Receiver.

**Ambler, Pa.**—The Philadelphia, Suburban, Gas and Electric Co. will lay additional gas mains through Ambler, and the line will be extended through other boroughs along the North Penn Railroad.

**Obion, Tenn.**—Citizens have voted \$30,000 bonds for electric light and water plants.

**Forney, Tex.**—Forney Electric Co. has been incorporated with \$10,000 capital stock by Yancey McKellar, J. M. Davis, Jr., J. C. Gardner and others.

**Levan, Utah.**—Establishment of municipal electric light plant and new water system is being considered.

**Holland, Va.**—A lighting plant and water works system will be constructed. Address the Mayor.

**Staunton, Va.**—Staunton Lighting Co. has been incorporated with \$150,000 capital stock; John M. Spotts, President.

**Grafton, W. Va.**—Grafton Traction Co. will remodel depot and equip as power plant.

**Milwaukee, Wis.**—Citizens and commercial bodies are urging lighting of downtown streets with ornamental cluster standard of five lights each. Address Sheriff H. E. Franke.

#### CONTRACTS AWARDED

**Little Rock, Ark.**—Equipping municipal electric light plant and installing 500 new electric lamps to Fort Wayne, Ind., Electric Works, \$39,500.

**Iola, Kan.**—Furnishing 16 posts for lights in court yard and cement bases, United Iron Works.

**Poughkeepsie, N. Y.**—Power house equipment, conduits and piping at Hudson River State Hospital, to Gaylord & Etapenc Co., Binghamton; about \$96,800.

**London, Ont., Can.**—Electric power equipment contract divided between Canadian General Electric Co. and Canadian Westinghouse Co., \$25,745 and \$24,781, respectively.

#### FIRE EQUIPMENT

**Ft. Smith, Ark.**—Fire station; architect not selected; owner, city.

**Chico, Cal.**—Citizens of south and southwest suburban districts will organize Volunteer Fire Department.

**New Haven, Conn.**—Fire house, \$10,000; Architects Allen & Williams; owner, city.

**Oscoda, Fla.**—Fire Department has been organized.—Andrew Brewer, Chief.

**Augusta, Ga.**—Chief Reynolds has recommended erection of fire station.

**Macon, Ga.**—City will have plans prepared by Curran R. Ellis for engine house.

**Lewiston, Ida.**—Council is considering equipping of two fire companies.

**Sandpoint, Ida.**—Council is considering \$13,000 bond issue for installation of fire alarm system and for other improvements.

**Cairo, Ill.**—Council has adopted ordinance establishing Station No. 3 with fire wagon.

**Colchester, Ill.**—Citizens will vote on bonds for purchase of new engine.

**Indianapolis, Ind.**—Chief Coots has recommended building of two new engine houses and purchase of motor chemical and hose for headquarters.

**Kingman, Ind.**—City has voted to purchase chemical engine.

**South Bend, Ind.**—The Board of Public Safety will purchase an auto patrol.

**Waterloo, Ia.**—City is considering building of three substations.

**Kansas City, Kan.**—Plans are being prepared for two fire houses, one at 14th st. and Reynolds ave., the other at 16th st. and Garfield ave.; to cost about \$10,000 each, by William E. Harris.

**Dexter, Me.**—Town has appropriated \$1,200 for fire service.

**Holyoke, Mass.**—Fire Commissioners are considering purchase of automobile hook and ladder truck.

**Lynn, Mass.**—A Councilman has introduced an order calling for plans and an appropriation to build another fire station.

**Natick, Mass.**—City has voted \$1,750 to improve the fire alarm service.

**New Bedford, Mass.**—Council has passed order providing for purchase of auto fire engine and 5,000 ft. of hose.

**North Andover, Mass.**—Town will purchase 500 ft. of hose and hook and ladder truck.

**Pittsfield, Mass.**—Chief Hazard asks for an auto truck, an auto combination wagon and a new fire station.

**Plymouth, Mass.**—Town has voted to

build two new fire stations at an estimated cost of \$15,000 and to purchase another second-class steamer.

**Weymouth, Mass.**—City has voted \$6,700 for the fire service and refused to purchase auto apparatus.

**Worcester, Mass.**—Chief Coleman proposes to give water guns a trial; if they meet his approval he will equip all hose wagons with this device.

**Berlin, N. J.**—Building Committee will prepare plans for fire hall.

**Clementon, N. J.**—Fire Co. No. 1 is raising funds for purchase of apparatus.

**Dover, N. J.**—Fire and Lamps Committee is urging purchase of motor combination wagon.

**Newark, N. J.**—Purchase of auto combination fire engine for use in Vailsburgh section is being urged; cost \$7,500.

**Passaic, N. J.**—Mayor Spencer and the Fire Committee have taken up purchase of auto engine; cost about \$8,500; also auto chemical, costing \$5,500.

**Albany, N. Y.**—Citizens are agitating for motor fire apparatus.

**Alexandria Bay, N. Y.**—This village contemplates purchasing a hook and ladder truck at a cost of about \$1,000.—J. S. Keefer, City Engineer.

**Eastwood, N. Y.**—Eastwood Hook and Ladder Company will raise funds for purchase of truck.—William Checkfield, Chief.

**Jamestown, N. Y.**—Board of Estimate and Review is considering purchase of several fire engines and possibly water tower.—Fred H. Wilson, Chief.

**Rome, N. Y.**—Board of Fire Commissioners will purchase a combination chemical and hose wagon for department.

**New York, N. Y.**—Deputy Commissioner A. J. O'Keeffe, of Brooklyn and Queens boroughs, has recommended erection of engine houses, purchase of several pieces of motor apparatus and installation of 200 new alarm boxes.

**Seneca Falls, N. Y.**—The question of organizing a hook and ladder truck company is being agitated.

**Sherrill, N. Y.**—This place is planning to secure village charter and organize fire department.

**Hamilton, O.**—Public Safety Committee is considering purchase of aerial truck.—A. W. Margedant, Director.

**Painesville, O.**—City will erect \$4,500 station; \$6,000 worth of equipment will be installed.—Geo. Eberl, Director of Public Safety.

**Sapulpa, Okla.**—This city is in the market for a truck wagon.—E. R. Stager, Fire Chief.

**Astoria, Ore.**—Chief Engineer C. E. Foster has recommended following fire department improvements: purchase of tower bell striker; of two smoke helmets; of two deluge sets; purchase and installation of pumps on several small boats to protect the water front; erection of engine house in Uniontown, and purchase of combination wagon for headquarters.

**Northampton, Pa.**—Hose house, \$8,000; associate architects, A. W. Leh, South Bethlehem, and L. J. H. Grossart, Allentown; owner, Borough of Northampton.

**Scranton, Pa.**—Fire engine house, \$7,500; architect, Fred L. Brown; owner, city.

**Barrington, R. I.**—Fire company is being formed; purchase of chemical engine is considered.—C. F. Hoeffer is interested.

**Tiverton, R. I.**—Purchase of chemical engine is being considered.

**Amarillo, Tex.**—Bonds have been voted for establishing a sub fire station.

**Norfolk, Va.**—Fire Chief McLaughlin has asked for purchase of automobile.

**Tacoma, Wash.**—Plans for a fire boat submitted by Fred A. Ballin and McCoy & Spear have been accepted.

**Whitman, Wash.**—Purchase of engine is being considered.

**Wheeling, W. Va.**—Fire Committee will ask Council to expend \$4,500 appropriated for auto apparatus for hose wagon for First Ward and new hose.

**Park Falls, Wis.**—Additional equipment is needed.

#### CONTRACTS AWARDED

**Cairo, Ill.**—500 ft. hose at \$1.05 a ft. from the Chicago Fire Hose Co., \$525; 500 ft. at \$1 from Gutta Percha Rubber Co., \$500; 500 ft. at \$1, from Manhattan Hose Co., \$500; 500 ft. at 95c., C. C. C. Fire Hose Co., \$475; 500 ft. to the Keystone Co., represented by the Woodward Hardware Co., at \$1, 500 ft. at 95c., New Jersey Car Spring Co., \$425; combination hose and chemical wagon with 35-gal. tank, the Seagrave Co., Columbus, O., \$1,750; two chemical tanks, American-La France Co., at \$350, \$700; six gate valves, from same company, \$48; one set harness, from same company, \$110; the Seagrave Co. donates chemical hand extinguishers, and each of the hose companies donates a shut-off gate.

**Holyoke, Mass.**—Knox Automobile Co. combination automobile for High st. engine house, \$5,100.

#### CONTRACTS AWARDED

#### ELECTRIC RAILWAYS

**Gadsden, Ala.**—It is probable that a street car line will be built to the Bellevue Hotel and Nocaluda Falls this spring; a survey has been completed which will permit a line being built on the mountain; a grade of only 4 7-10 ft. to the 100 ft. has been secured through the survey that has been made; the car line will be built on a 30-ft. roadway or street, to start at the foot of the mountain and wind to the top.

**Pine Bluff, Ark.**—Citizens' Light & Transit Co. will rebuild.—W. Y. Ellis, Chief Engineer.

**Griffin, Ga.**—Griffin City & Suburban Railway will extend line about one mile to State Agricultural Station. A. D. Adkin, 312 Boundary Ave., can be addressed.

**East St. Louis, Ill.**—East Side Belt Railway & Terminal Association has been incorporated to operate belt line around city; Incorporators are: C. T. Smiley, of O'Fallon, Ill.; Albert E. Meints, Fred W. Kraft, William H. Hauss and John L. Flannigan. **Harvey, Ill.**—Hammond, Whiting & East Chicago Electric Ry. Co. will begin active construction at once on its proposed extension between Hammond and this city.—D. M. Cummings, Chicago, President.

**Joliet, Ill.**—Joliet & Southern Traction Co. has asked for franchise on Jackson st.

**Fort Wayne, Ind.**—Toledo & Indiana Railroad has decided to at once complete line from Bryan, O., to this city.

**Independence, Kan.**—Union Traction Co. will build 5-mile city line.—D. H. Siggins, Coffeyville, President.

**Kansas City, Kan.**—The Metropolitan Street Railway Co. has been requested by Council to build a car line on 18th st. from Central to Minnesota ave; L. W. Keplinger, City Counselor, prepared the ordinance.

**Topeka, Kan.**—Council has authorized Topeka Railway Co. to extend lines; must give \$15,000 bond to complete work in three years.—C. B. Burge, City Clerk.

**Frankfort, Ky.**—A joint meeting of the Business Men's Clubs of Owenton and of this city will be held in the near future to launch a scheme for the building of an electric line from this city to Owenton; necessary capital to build road has been secured.

**Louisville, Ky.**—Louisville Railway Co. will at once extend Fern Creek interurban line to Mt. Washington.

**New Orleans, La.**—New Orleans Railway & Light Co. has asked for franchise for extension of West End line along lake front.

**Silver Spring, Md.**—Silver Spring & Damascus Ry. Co. has applied for charter to build electric railway between Silver Springs and Damascus; capital, \$250,000.—Charles F. Nesbit and Lee L. Latimer, Washington, D. C.; H. M. Martin, Charles D. Muir, J. Dawson Williams and Preston B. Ray, Incorporators.

**Westfield, Mass.**—Western Massachusetts Street Railway Co. is planning to expend \$50,000 on repairs and new work.

**Worcester, Mass.**—Board of Aldermen has granted franchise to Providence & Worcester Street Railway Co. to construct line on certain streets.

**Owosso, Mich.**—Lansing & Northeastern Electric Railway, Lansing, has been granted franchise to build electric railway.

**Kansas City, Mo.**—W. D. Miles, O. H. Dean and others will apply for franchise for street railway on Baltimore ave.

**Syracuse, N. Y.**—Rapid Transit Co. is considering extension of line on Court st.

**Newbern, N. C.**—Neuse-Trent Traction Co. has been incorporated to build electric railway from Newbern to Trenton.—C. L. Stevens, W. G. Gilbert and H. I. Crumpler, Newbern, Incorporators.

**Oklahoma City, Okla.**—Surveyors of the Oklahoma Railway Co. are surveying up Britton ave., the main street of Britton, for the new track to the Ladies' Seminary, two miles north of Britton.

**Pottsville, Pa.**—Council has granted Eastern Pennsylvania Ry. Co. right to double-track line.—L. C. Bradley, General Manager.

**Austin, Tex.**—Austin Electric Railway Co. is considering improvements.—W. J. Jones, President.

**Coleman, Tex.**—Engineer Steber, with his corps of surveyors, is busy making arrangements to start surveying the entire line of the Texas North and South Railway from Seymour to San Antonio; the road will be built south to the Colorado River in this county by next fall.

**Dallas, Tex.**—C. L. Wakefield, one of the chief promoters of the proposed interurban electric railway, says a road is to be built between this city and Terrell, Tex.

**Dallas, Tex.**—Grade lines for the use of the interurban railway builders in East Dallas are already being plotted in the office of the City Engineer J. M. Preston, for J. Mercer Carter and associates.

**Palestine, Tex.**—Palestine business men

are seriously considering the proposition of Col. George W. Burkitt, of Houston, to establish a street car system here. Col. Burkitt is owner of the local light plant, and says \$40,000 will be enough capital on which to launch the enterprise, and that he is willing to take one-fourth of the capital stock; Mr. Burkitt is of the opinion that the light plant could furnish all the required power; thus the expense of a power house and equipment could be saved; no franchise has ever been given by the city for the erection and operation of a street car system.

**Victoria, Tex.**—Council has granted J. K. Hexter, John J. Welder, T. D. Wood, V. A. and A. A. Sitterle, J. W. Rutland, J. A. McFaddin, Frank H. Lander and Joseph H. Fagan 50-year franchise for street railway, covering all streets of the city, except four blocks on Main st., for either or both electric and motor cars and passengers, light freight, express and mail.

**Provo, Utah.**—Jesse Knight has declined the franchise granted him to build an interurban line on the ground that he had been unable to secure satisfaction from Salt Lake and Salt Lake County; A. J. Evans, representing the Evans-Chipman syndicate, asked that the Knight franchise be turned over to his company, and asking 60 days in which to select a route and stated that if the franchise is granted the road will be built by home capital; the petition was referred to a committee.

**Poultney, Vt.**—Trustees have granted Rutland Railway, Light & Power Co. permission to build electric railway.

**Charleston, W. Va.**—Company has been chartered to construct line between this city and Dunbar. E. T. Crawford, W. L. Ashby, J. E. Crawford and others, Incorporators.

**Wheeling, W. Va.**—The City & Elm Grove Railroad Co. has made application to the town of Edgewood for a franchise granting to it the right to construct and maintain in the streets, lanes and alleys of the said town the necessary poles, wires and other fixtures for the purpose of electric power and appliances to the said town.—Charles Madden, Secretary.

**Plum City, Wis.**—Plum Valley Railroad Co. is considering construction of line; two routes considered, viz.: from Spring Valley via Gall and Arkansaw to Pepin, or from Spring Valley via Rock Elm, Exile, Plum City to Pepin.

#### CONTRACTS AWARDED

**Hamilton, O.**—Track improvement near Sidney for C. H. & D. R. R., to John B. Carter Construction Co., Chicago, Ill.; \$500,000; 21 bidders.

**Galveston, Tex.**—Clearing, grading and culvert work for first half of new interurban line from Galveston to Houston, to Kelsel & Vautrin, city.—H. S. Cooper, Manager Galveston Electric Co.

#### BRIDGES

**Fort Smith, Ark.**—Free Bridge Commission will construct nine spans of about 196 ft. center to center of piers; structure designed to provide for street railway and standard steam railway tracks; also roadway and two sidewalks.—Waddell & Harrington, Wilson Bldg., Kansas City, Mo., Engineers.

**Los Angeles, Cal.**—County Highway Commission has submitted to Board of Supervisors plans and specifications for 51 bridges and culverts on the Bassett-Pomona road; a reinforced concrete bridge 240 ft. long is planned for Sycamore Canyon, near Eagle Rock; 2 bridges are included in the improvement of Whittier Road from Los Angeles to East Whittier.

**Sacramento, Cal.**—The Board of Supervisors favors changing the plans for the bridge of the Southern Pacific Co. from a swing drawbridge to a vertical lift bridge; the change would add to the space through which steamers must pass and cause a saving of almost \$100,000 in the construction of the bridge now provided for. Address John Lyle Harrington, representing Engineers, of Kansas City, Mo., or County Surveyor Pinhey.

**San Diego, Cal.**—Plans are being prepared for the construction of artistic trestle across canyon at entrance of Kensington Park.

**San Rafael, Cal.**—County Commissioners have rejected all bids for construction of Belvedere-Tiburon bridge; new plans and specifications will be prepared.

**Visalia, Cal.**—Election will be held Apr. 18 on \$95,500 bond issue to build reinforced concrete conduit and bridges and repair asphalt pavement.—Morve L. Weaver, Engineer.

**Hartford, Conn.**—Board of Finance has recommended reconstruction of Farmington ave. bridge; cost, \$18,000.

**Atlanta, Ga.**—City Engineer R. M. Clay-

ton has completed drawings of Alabama st. viaduct; cost, \$250,000.

**Waycross, Ga.**—City is considering construction of culvert; cost, \$1,600.

**Cairo, Ill.**—County Commissioners are considering erection of \$2,000 bridge over Cache River.

**Lewiston, Ill.**—County Bridge Committee has decided on construction of bridge in Bernadotte Township.

**Springfield, Ill.**—The Boards of Commissioners of Sangamon and Christian counties will construct a steel and concrete bridge in Illiopolis Township, to cost \$5,000.—C. C. Okel, County Clerk, Springfield; M. Burke, County Clerk, Taylorville, Ill.

**Fort Wayne, Ind.**—County Commissioners have voted to build bridge across St. Joe River.

**Richmond, Ind.**—Milton Township is urging erection of bridge across Noland's Fork.

**Hiawatha, Kan.**—County Commissioners are considering constructing 110-ft. bridge across Wolf River.

**Colfax, La.**—Citizens will vote May 10 on bond for bridges and roads.—J. W. Duncan, President Fonce-Jury.

**Boston, Mass.**—Boston and Chelsea must pay share for proposed reconstruction of Chelsea bridge between Charlestown and Chelsea, at cost of \$100,000; War Department believes draw should be widened to 125 ft. with a clear height under draw span of not less than 75 ft. at main high water; draw should also be located at more southerly point. Address Lt.-Col. Edward Burr, U. S. Engineers, Room 95, P. O. Blvd.

**Gloucester, Mass.**—A bridge 20 to 25 ft. wide will be built at Little Good Harbor Beach to replace the one damaged by a storm.

**Anthony, Minn.**—Town Board has decided to construct bridge across Marsh River.

**Duluth, Minn.**—Small bridge will be constructed on 71st ave. West, between Sherburne and Columbia sts., by Board of Public Works.

**Kansas City, Mo.**—Cost of raising and lengthening bridges across Kaw River has been estimated at \$1,500,000.

**Polson, Mont.**—Citizens have raised \$3,000 toward construction of the bridge across Pend Oreille River; proposed structure will be 1,744 ft. in length.

**Winnebucca, Nev.**—County has accepted plans and specifications for construction of bridge over Humboldt River; bids for work will be advertised soon.

**Cohoes, N. Y.**—This city contemplates painting five bridges.—Geo. T. Bolton, City Engineer.

**Fenton, N. Y.**—Towns of Fenton and Chenango will vote Apr. 12 on erection of highway bridge at Chenango bridge.

**New York, N. Y.**—Board of Estimate has been asked for \$700,000 this year as \$1,500,000 is required to strengthen Williamsburg Bridge for subway trains; heavy steel supports are to be built under the two land spans in Manhattan and Brooklyn, and portions of the towers below the bridge structure are to be reinforced.—Kingsley S. Martin, Commissioner of Bridges.

**North Pelham, N. Y.**—Village Trustees will endeavor to compel New York, Westchester and Boston Railway to construct wall instead of dirt embankment and build bridges over the streets.—President Reilly.

**Salamanca, N. Y.**—This city will construct a concrete bridge, 400x50 ft.—C. C. Cheney, City Engineer.

**Schenectady, N. Y.**—New bridge may be built at Vischer Ferry, opposite Niskayuna. Address Wesley E. Cobb, Secretary Board of Trade.

**Vernon, N. Y.**—Council will expend \$1,000 for construction of foot bridges over Sconondoa Creek and Bartholomew's dike.

**Belpre, O.**—The Village Council granted a franchise to the Parkersburg Bridge Co. for the construction of a bridge.—J. C. Brennan, Marietta, Village Solicitor.

**Cincinnati, O.**—Bridge Engineer F. E. Morris has submitted plans, specifications and estimates for three new bridges to Director Sundmaker and to Council for approval; one bridge is to cross Burbank st. and the Cincinnati, Lebanon & Northern Railroad tracks and cost \$14,850; another will be at Powers st. and will cross the west fork of Mill Creek, cost \$6,177; a third will cross the Cincinnati, Lebanon & Northern tracks at Whittier st. and cost \$7,075.

**Dayton, O.**—J. C. Ely, Director of Public Service, accepted the plans and specifications of the New York Concrete Steel Engineering Co., New York City, for the 7-span concrete-steel bridge at Stewart st.; cost about \$170,000.

**Fremont, O.**—The Engineer of Sandusky County was instructed to prepare plans for a concrete bridge in Washington Township.

**Lisbon, O.**—County Engineer French and J. Q. Rothany, Engineer, East Liverpool Traction & Light Co., are considering repairing of bridge recently washed out.

**Portsmouth, O.**—Residents of Arion are

urging County Commissioners to construct a bridge.

**Zanesville, O.**—Muskingum County contemplates constructing a 30-ft. bridge across the Kent Run, a tributary of Salt Creek, in Blue Rock Township. Address County Auditor.

**Coalgate, Okla.**—Coal County Commissioners will advertise for bids for construction of 24 steel bridges.—E. T. Brown, City Engineer.

**Tulsa, Okla.**—Bonds have been voted for the construction of viaducts and bridges.—E. B. Cline, City Auditor; D. C. Fenstermaker, City Engineer.

**Dallas, Tex.**—Municipal Commissioners will construct 60-ft. steel span across Turtle Creek on Cedar Springs ave.; cost, \$7,000; day's labor; plans by City Engineer J. M. Preston.

**Ennis, Tex.**—A 60-ft. bridge is to be constructed across Chambers st. near Avalon.—J. B. Overall, County Commissioner.

**Houston, Tex.**—Plans have been approved for a steel 1,600-ft. long bridge to be constructed over the Houston ship channel at foot of Main st.; approximate cost \$225,000.

**Port Lavaca, Tex.**—Calhoun County Commissioners will construct bridge over Caloma Creek.

**Brockville, Ont., Can.**—Citizens have voted \$16,000 bonds for construction of six bridges throughout town.

## CONTRACTS AWARDED

**Topeka, Kan.**—Building extension to Milan arch bridge, A. D. Johnson, as per Milan patent; other bids, McQuire-Stanton Co., Topeka Bridge and Iron Co.—Councilmen Drew, Tandy and Jordan, Committee

**St. Joseph, Mich.**—Substructure for swing bridge on Wayne st., to G. A. Allmendinger, of Benton Harbor, \$18,295.

**Hudson, N. Y.**—For building a bridge over Claverack Creek: E. J. Doyle & Co., Albany, at \$7,945; other bids: Kennedy & Easton Construction Co., Albany, \$8,378; William King and Peter J. Lamb, Watervliet, \$8,994.20; Marks Kearney, Hudson, and Harry S. Williams, Clermont, \$9,412; Morris Kantowitz, Albany, \$10,800.

**Knoxville, Tenn.**—Moreland & Moses, to construct eight reinforced concrete bridges along the turnpike.

**Brady, Tex.**—Bridge across San Saba River, near Voca, the Missouri Bridge Co., of St. Louis, Mo., \$9,900.

**Dallas, Tex.**—O'Rourke Construction Co., two tons reinforcing steel for new bridge at Cedar Creek.

## BIDS RECEIVED

**Albany, N. Y.**—Bridge over Claverack Creek: E. J. Doyle & Co., city, \$7,945; Kennedy & Easton Constr. Co., city, \$8,378; Wm. King and Peter J. Lamb, Watervliet, \$8,994; Marks Kearney, Hudson, and Harry S. Williams, Clermont, \$9,412; Morris Kantowitz, city, \$10,800. Bridge over Roeliff Jansen Kill, between Livingston and Clermont: United Constr. Co., city, \$5,837, and Canton Bridge Co., city, \$6,090.

**Livingston, N. Y.**—Bridges over Claverack Creek and Roeliff Jansen Kill: Bridge over Claverack Creek, E. J. Doyle & Co., Albany, N. Y., \$7,945; Kennedy & Easton Construction Co., Albany, \$8,378; William King and Peter J. Lamb, Watervliet, N. Y., \$8,994; Marks Kearney, Hudson, N. Y., and Harry S. Williams, Clermont, N. Y., \$9,412; Morris Kantowitz, Albany, \$10,800. For the Roeliff Jansen Kill bridge, United Construction Co., Albany, \$5,837; Canton Bridge Co., Albany, \$6,090.

## MISCELLANEOUS

**Berkeley, Cal.**—Playgrounds will be built in the public schools at once.

**Oakland, Cal.**—City will construct sea wall 1,600 ft. long and possibly 1,150 ft. additional.—F. C. Turner, City Engineer.

**Sacramento, Cal.**—An expert will be engaged by Board of Supervisors to go over plans for new county jail before work is started; appropriation \$750.

**New Haven, Conn.**—Texas oil is to be used as an experiment in sprinkling streets. Director Eames, Board of Public Works.

**Rome, Ga.**—City is considering \$25,000 bond issue for erection of City Hall and other improvements.

**Sandpoint, Ida.**—Council is considering \$13,000 bond issue for erection of City Hall and for other improvements.

**Joliet, Ill.**—Mayor Cronin has recommended that Committee on Parks take up matter of establishing small parks and playgrounds.

**South Bend, Ind.**—Plans for building an iron fence along the river at Howard Park have been made.

**Kansas City, Kan.**—Plans for a comfort station at Shawnee Park, to cost \$4,000, has been prepared by William E. Harris.

**Kansas City, Kan.**—Surveys for the big concrete wall to protect the Seventh Ward

of Kansas City, formerly Argentine, has been begun by a force from the office of A. M. Bunn, Chief Engineer for the Kaw Valley Drainage Board; construction work will begin within a month; the concrete wall will extend from the old Argentine pumping station, south and west, a distance of 4,000 ft. and will have an average height of 10 ft.; in several places it will be 20 ft. high; the wall will not parallel the Kaw River bank; a low bottom will extend between it and the river; the wall follows the general direction of the Atchison, Topeka & Santa Fé Railroad Co.'s tracks; estimated cost \$42,878.

**Lexington, Ky.**—Plans, etc., will be prepared by W. E. Newman, Civil Engineer, for open court adjoining jail, 35x51 ft. with 18-ft. wall of reinforced concrete.—J. Percy Scott, County Judge.

**Boston, Mass.**—Public hearing on garbage disposal is to be given April 14 in city hall; \$300,000 loan order for establishment of garbage incinerators is being considered by Council.—Councilman Matthew Hale, Chairman Council Executive Committee.

**Malden, Mass.**—Council has ordered Street and Water Committee to prepare plans and estimates of cost of covering and walling brook that flows from Russell to Pearl st.

**Greenville, Miss.**—Board of Mississippi Levee Commissioners has voted on recommendation of Chief Engineer Shackelford to advertise for bids for the construction of 900 and 27,000 cu. yds. of new levees.

**Kansas City, Mo.**—Council will consider resolution appropriating \$10,000 to improve holdover.—T. R. Marks, Police Commissioner.

**Lebanon, Mo.**—Citizens will vote on \$20,000 improvement bonds.

**Atlantic City, N. J.**—Council has voted \$3,000 for laying out grass plots at Boardwalk ends of elevated streets.

**Brooklyn, N. Y.**—Dock Commissioner Calvin Tomkins is planning to spend many thousands of dollars in the improvement of the Brooklyn water front, according to a statement filed with the Board of Estimate and Apportionment; the Board has approved the general plan calling for expenditures of \$70,000 to rebuild the Broadway terminal, \$40,000 for the Roosevelt st. and \$15,000 for the 23d st. slips and buildings; for the general municipalization of the water front in Brooklyn and Queens, Commissioner Tomkins asks the following appropriations for piers as specified: Foot of 29th st., \$125,000; 30th st., \$84,000; 31st st., \$180,000; 33d st., \$240,000; 35th st., \$340,000; shed for same pier, \$275,000; new pier, 36th st., \$50,000; pier foot of Gold st. \$16,000; pier at Whale Creek, \$55,000; foot of Nott ave., Queens, \$25,000; Whitestone Landing, \$20,000; 10th St., College Point, \$15,000; the Brooklyn piers at the foot of 33d and 35th sts. will be 1,800 ft. long; Commissioner Tomkins also requests \$380,000 for two new piers along the Brooklyn water front, the sites of which have not yet been determined upon; for building a new ferry house at the foot of 39th st. for the municipal ferry, a request is made for \$350,000; also \$25,000 to establish a recreation pier in Brooklyn.

**Newburgh, N. Y.**—The Board of Health has decided to lay a sewer on Montgomery st. between Newburgh Academy and South st.

**Rochester, N. Y.**—The Board of Contract and Accounts has adopted a resolution that the 1910 contract for sweeping and cleaning asphalt streets shall be let as a whole, instead of in groups as heretofore; this is for the purpose of having one man responsible for the work, rather than dividing it.

**Cincinnati, O.**—Harry Hake, Andrews Bldg., has completed plans for \$30,000 bath house for men, to be erected on Freeman ave.; also for bath house for women on Cutler st.

**Cleveland, O.**—Councilman Haserodt has introduced an ordinance authorizing an expenditure of \$2,200 for a new machine and the trading in of the old Council machine at \$1,000.

**Dayton, O.**—Specifications for sprinkling contract will be changed so as to make contractor liable for damages from operation of carts, etc.—Daniel J. Murphy, Secretary Engineering Department.

**Hamilton, O.**—C. H. & D. Railroad is about to let a number of large contracts for track improvement in this section.—F. H. Alfred, Assistant to President William Carter.

**Toledo, O.**—Council will consider ordinance giving authority to Director of Public Service to make five-year contract for disposal of garbage.

**Cornish, Okla.**—City is considering erection of City Hall and Courthouse; will soon advertise for bids.

**Lawton, Okla.**—Citizens will vote Apr. 26 on \$40,000 bonds for Squaw Creek improvement.—Z. M. Scifres, City Engineer.

**Tulsa, Okla.**—This city will issue \$25,000 of bonds for the construction of an incin-

erating plant.—E. B. Cline, City Auditor; D. C. Fenstermaker, City Engineer.

**Bradford, Pa.**—City Engineer B. A. Wise, in accordance with the request of the State Board of Health, has submitted to Council an estimate of the cost of a garbage disposal plant, \$91,248.

**Reading, Pa.**—Council will consider erection of public library.

**Alice, Tex.**—Citizens will vote Apr. 16 on \$10,000 bonds for erection of City Hall.

**Port Arthur, Tex.**—Plans are being prepared by C. A. Logan for Carnegie library; cost, \$20,000.

**Sherman, Tex.**—The Secretary was authorized to advertise for bids on garbage hauling, the bids to be opened at the meeting to be held on the third Monday night in May.

**Provo, Utah.**—On recommendation of the Buildings and Grounds Committee \$8,000 will be allowed the Park Commissioners this year for necessary work of beautifying the city.

**Wheeling, W. Va.**—Council has adopted report of special Crematory Committee recommending Decarie incinerating plant for approval.

**Milwaukee, Wis.**—Board of Public Works will advertise for bids for 500,000 gallons of oil for sprinkling purposes.

### CONTRACTS AWARDED

**Heber, Ark.**—Erecting jail, R. R. Brown, \$8,000.

**Waterbury, Conn.**—Improving city hall, to Chatfield & Chatfield; \$4,683.

**Springfield, Mass.**—Street sprinkling to F. M. Cook & Co., at 35½ per cent under schedule price; and to Bottum Bros., for Florence, 28 per cent below schedule.

**Jersey City, N. J.**—Removal of garbage and ashes, Apr. 1 to Nov. 30, to Henry Byrne, second lowest bidder, \$28,000; Wm. Montgomery, 8 Mill Road, lowest bidder, \$23,000.

**Mt. Vernon, N. Y.**—Frank Nordine, for collector of garbage for three years.

**Woonsocket, R. I.**—Street watering contract, to Woonsocket Teaming Co., \$4.49 a day for man, cart and horses.

**Dallas, Tex.**—Blueprints and supplies for Engineer's office, to Texas Blue Print Co.

**El Paso, Tex.**—Constructing refuse incinerator and sewage pumping station, contract B: (a) Furnace combustion chamber, pre-heater, refuse boxes, tools, flues, instruments, duplicate materials and tests (lump sum); (b) generators, motors, pumps, valves, piping, ventilating apparatus and lists (lump sum); (c) electric crane, platform, scales, float gauge and lists (lump sum); (d) boilers, feed pumps, feed water heater, and steam piping (lump sum); (e) self supporting steel stack and foundations (lump sum); (f) totals—Public Works Engineering Co., Beck Bldg., Portland, Ore., (a) \$21,975, (b) \$16,415, (c) \$3,125, (d) \$10,930, (e) \$4,792, (f) \$57,237; the Destructor & Power Specialty Co., 111 Broadway, New York, N. Y., (a) \$39,100, (b) \$12,810, (c) \$2,650, (d) \$4,740, (e) \$2,400, (f) \$61,700. Public Works Engineering Co., Portland, Ore., awarded contract.—F. H. Todd, City Engineer.

### TOO LATE FOR CLASSIFICATION

#### STREET IMPROVEMENTS

**Gadsden, Ala.**—Council has passed ordinance for paving 3d st. with brick.

**Mobile, Ala.**—County Board of Revenue and Road Commissioners have decided to call election No. 8 on \$500,000 bonds for constructing permanent road system.

**Oakland, Cal.**—Council has given final passage to ordinances appropriating \$7,000 for paving crossings on E. 14th st.

**Bridgeport, Conn.**—Bids will be received by Board Park Commissioners for 600 tons of ¾-in. trap rock or broken stone suitable for park drives and 200 tons of stone dust for use on roads in park.—B. F. Cooney, Clerk.

**Wilmington, Del.**—Council has agreed upon list of streets to be improved this year at cost of \$350,000.

**Chicago, Ill.**—Bids will be received Apr. 12 for excavating and graveling about 43,000 cu. yd. of earth and clay in Douglas Park.—G. A. Mugler, Secretary, West Chicago Park Commissioners.

**Marion, Ind.**—Paving of 18th st. is being urged.

**Vincennes, Ind.**—Board of Works has ordered improvement of Vollmer st. and Indiana ave.

**Corning, Ind.**—City has voted bonds for street paving.

**Perry, Ia.**—City is calling for bids April 15 for construction of following: Contract 1: 20,600 sq. yd. Warren's bitulithic pavement on concrete foundation; 9,500 ft. combined curb and gutter and 5,000 cu. yd.

grading. Contract 2: 33,700 sq. yd. cressotted block on concrete foundation; 18,850 ft. 6 x 20-in. cement curb and 11,000 cu. yd. grading.—Chas. Wilson, City Engineer.

**Freetown, Mass.**—Town has voted \$5,000 for road repairs.

**Lawrence, Mass.**—City Engineer A. D. Marble has asked for bids for 6,000 ft. of edgestones.

**Palmer, Mass.**—Citizens have voted appropriation to build macadam road.

**Badger, Minn.**—Bids will be received Apr. 16, 2 P. M., by Town Board of Barnett, for grading.—Jas. Tye, Town Clerk.

**Minneapolis, Minn.**—Bids will be received April 18, 11 A. M., for graveling road No. 85.—H. R. Scott, Auditor, Hennepin County.

**Omaha, Neb.**—Bids will be received Apr. 11, 2 P. M., for grading seven streets.—Geo. W. Craig, City Engineer.

**Concord, N. H.**—Bids will be received Apr. 15, 1 P. M., for resurfacing 3½ mi. of Merrimack Valley road.—H. C. Hill, State Engineer.

**Atlantic City, N. J.**—Council is considering paving of Michigan, Ohio and other avenues.

**South River, N. J.**—South River Council has petitioned Board of Freeholders to macadamize street from Main st. to Drury's Corner.

**Bowling Green, O.**—Bids will be received April 18, 1 P. M., for grading Christian Pennington stone road.—E. F. Metzger, County Surveyor.

#### BIDS RECEIVED

**Washington, D. C.**—Collection and disposal of ashes, garbage, dead animals, night soil and miscellaneous refuse in the district and for the removal of ashes and refuse from buildings under the control of Commissioners:

To collect garbage: Lewis Bros., Gunston, Va., \$85,000 for one year; \$75,000 per annum for 3-yr. period; \$75,000 per year for 5-yr. period.

To dispose of garbage: S. E. Wilson, of Cincinnati, O., \$12,000 per yr. for 5-yr. period. The Washington Fertilizer Co., city, submitted three different schemes, with prices as follows: \$19,000 per year of 1-yr. period; \$16,000 per yr. for 3-yr. period; \$14,000 per yr. for 5-yr. period; \$20,000 per yr. for 1-yr. period; \$17,000 per yr. for 3-yr. period; \$15,000 per yr. for 5-yr. period; \$20,000 for 1-yr. period; \$17,000 for 3-yr. period; \$15,000 for 5-yr. period. Lewis Bros., Gunston, Va., \$20,000 for 1-yr. period; \$18,000 per yr. for 3-yr. period; \$15,000 per yr. for 5-yr. period.

To collect and dispose of garbage: S. E. Wilson, Cincinnati, O., \$77,000 per annum for 5-yr. period. Washington Fertilizer Co., of Washington, three schemes, with prices as follows: \$78,400 per yr. for 1-yr. period; \$69,900 per yr. for 3-yr. period; \$67,400 per yr. for 5-yr. period; \$82,400 per yr. for 1-yr. period; \$76,800 per yr. for 3-yr. period; \$74,300 per yr. for 5-yr. period; \$92,400 per yr. for 1-yr. period; \$84,800 per annum for 3-yr. period; \$80,000 for 5-yr. period. Lewis Bros., Gunston, Va., \$100,000 per yr. for 1-yr. period; \$90,000 for 3-yr. period; \$84,800 per annum for 5-yr. period.

To collect dead animals. No bids.

To dispose of dead animals: Robert E. Mann, \$2,240 per annum for 1-yr. period; \$2,020 per annum for 3-yr. period; \$1,810 per annum for 5-yr. period.

To collect and dispose of dead animals: Robert E. Mann, \$3,540 per annum for 1-yr. period; \$3,180 per annum for 3-yr. period; \$2,855 per annum for 5-yr. period. Lewis Hopfenmaier, \$2,590 and \$3,590 per annum.

To collect and dispose of night soil: M. R. Ready, \$21,000 per annum for 1-yr. period; \$19,000 per annum for 3-yr. period; \$16,900 per annum for 5-yr. period. Warner Stutler, \$17,000 per annum for 1-yr. period; \$16,300 per annum for 3-yr. period; \$16,000 per annum for 5-yr. period.

To collect miscellaneous refuse: Joseph Marrone, of Brooklyn, N. Y., \$31,000 per annum for 1-yr. period; \$32,000 per annum for 3-yr. period; \$33,000 per annum for 5-yr. period. Warner Stutler, \$29,600 per annum for 1-yr. period; \$29,100 per annum for 3-yr. period; \$28,700 per annum for 5-yr. period. I. T. Brown, of New York, \$29,975 per annum for 1-yr. period; \$32,000 per annum for 3-yr. period; \$35,000 per annum for 5-yr. period.

To dispose of miscellaneous refuse: Joseph Marrone, of Brooklyn, \$4,000 per annum for 1-yr. period; \$4,000 per annum for 3-yr. period; \$4,000 per annum for 5-yr. period. I. T. Brown, of New York, \$29,975 per annum for 1-yr. period; \$32,000 per annum for 3-yr. period; \$35,000 per annum for 5-yr. period.

To collect and dispose of miscellaneous

refuse: M. R. Ready, \$35,000 per annum for 1-yr. period; \$32,500 per annum for 3-yr. period; \$29,903 per annum for 5-yr. period. Joseph Marrone, of Brooklyn, \$35,000 per annum for 1-yr. period; \$35,000 per annum for 3-yr. period; \$35,000 per annum for 5-yr. period. Warner Stutler, \$29,900 per annum for 1-yr. period; \$29,400 per annum for 3-yr. period; \$29,000 per annum for 5-yr. period. Caton & Killeen, \$15,565 per annum for 5-yr. period. I. T. Brown, of New York, \$29,975 per annum for 1-yr. period; \$32,000 per annum for 3-yr. period; \$35,000 per annum for 5-yr. period.

To collect and dispose of ashes: R. G. Israel, \$81,000 per annum for 1-yr. period; \$81,900 per annum for 3-yr. period; \$80,336 per annum for 5-yr. period. Pollock Drayage & Storage Co., \$71,044 per annum for 1-yr. period; \$77,044 per annum for 3-yr. period; \$82,044 per annum for 5-yr. period; James W. Bean, \$75,350 per annum for 1-yr. period; \$74,500 per annum for 3-yr. period; \$73,900 per annum for 5-yr. period. Caton & Killeen, \$68,500 per annum for 5-yr. period.

To collect and dispose of ashes and refuse from buildings under the control of the Commissioners: M. R. Ready, 50c. per yd. for 1-yr. period; 46c. per yd. for 3-yr. period; 44c. per yd. for 5-yr. period. Warner Stutler, 46c. per yd. for 1-yr. period; 45c. per yd. for 3-yr. period; 44c. per yd. for 5-yr. period. J. F. Conrad, 39c. per yd. for 1-yr. period.

General proposal covering whole work: Washington Fertilizer Co. proposed to undertake the work of collecting and disposing of garbage, miscellaneous refuse and ashes for \$172,000 per annum for a 5-yr. period, provided the collections are within the present fire limits, and \$182,000 per annum of the fire limits are extended. George Hyman proposed to undertake the work of collecting and disposing of miscellaneous refuse and ashes at \$100,000 per annum for a 1-yr. period; \$105,000 per annum for a 3-yr. period; and \$110,000 per annum for a 5-yr. period.

**New York, N. Y.**—Furnishing material and dredging about 200,000 cu. yds. in Boughs of Manhattan, Brooklyn, Queens and the Bronx, price given per cu. yd.: P. Sanford Ross, Inc., 24.9c.; R. G. Packard Co., 20.8c.

**Philadelphia, Pa.**—Dredging plant: Peter Hagan & Co., two tugboats, \$8,000 and \$14,000; a dipper dredge, \$50,000; combination dredge, \$18,000, and three scows, \$12,000. Samuel Holmes, clam-shell dredge, \$30,000; dipper dredge, \$12,000; three scows, \$4,000; three scows, \$5,025; two scows, \$5,550; one scow, \$5,600; two dumpers, \$2,100; five dumpers, \$1,800; dredge and scow outfit, \$30,000; three scows, \$18,000; sea-going hopper dredges, \$65,000 and \$55,000. Anthony J. Loper, tugboat, \$9,000. River & Harbor Improvement Co., a scow of 552 yds. capacity, \$9,000; scow, 542 yds. capacity, \$9,000. Elliott Machine Co., 18-in. hydraulic dredge, \$88,500. Francis O'Brien, 20-in. hydraulic dredge, \$45,000. P. Sanford Ross Co., three scows, \$4,150; three scows, \$3,300; tugboat, \$10,500; tugboat, \$12,600. John Damers & Co., tugboats, ranging in price from \$15,000 to \$35,000. Charles S. Mason, agent, one tug, \$6,950.

**Eaton, O.**—Bids will be received Apr. 18, noon, for grading and paving portions of E. Main st.—C. F. Ressler, Village Clerk.

**Waldo, O.**—Bids will be received Apr. 18, noon, for resurfacing North st.—W. D. Krauter, Corporation Clerk.

**Weston, O.**—Bids will be received May 2, noon, for improving portions of Taylor st.—Riggs & Sherman Co., 615 The Nasby, Toledo, Engineers.

**Lansdowne, Pa.**—Bids will be received Apr. 22, 8 P. M., for paving portions of Baltimore ave. with shell blocks, bitulithic and asphalt street paving.—J. W. Davis, 22 Runnemede ave., Borough Secretary; W. C. Shuster, Jr., Chairman, Highway Committee.

**Sayre, Pa.**—Petitions have been filed for brick paving.—N. F. Walker, R. F. D., Athens, Engineer.

**Knoxville, Tenn.**—Paving of improved section of Main st. is being considered.

**Nashville, Tenn.**—Highway Commission is planning better roads; \$2,500,000 bond issue recommended.—Maj. E. C. Lewis, Chairman.

**Sherman, Tex.**—Bids will be received May 2 for about 21,650 sq. yds. paving, 8432 cu. ft. curbing and 491 lin. ft. header.—J. C. Wall, Mayor.

**Ellensburg, Wash.**—Council has asked for bids for 49,200 sq. yd. of paving and 17,000 cu. yd. excavation.—G. N. Miller, City Engineer.

**Milton, Wash.**—Town is considering macadamizing of Main St.

**Newport, Wash.**—Council is considering

construction of crosswalks at intersections in South Newport.

**Milwaukee, Wis.**—Macadamizing of Highland boulevard is being urged.

#### CONTRACTS AWARDED

**Los Angeles, Cal.**—Grading and constructing culverts on Harbor Boule. to Oil Macadam Paving Co., Long Beach, \$13,333.

**San Diego, Cal.**—Paving with asphalt First St. to Barber Asphalt Paving Co., \$50,077.

**Augusta, Ga.**—Cement sidewalk work, A. A. Hett & Co., lowest bidder, 9½¢ per sq. ft.

**Iowa City, Ia.**—Brick paving, 5300 sq. yds., on Church and other streets to Timothy Bradley for \$10,498.

**Hagerstown, Md.**—Grading West Side ave., to W. Lloyd.—J. B. Ferguson, Engineer.

**Atlantic City, N. J.**—Paving Victoria Ave. with bitulithic to United Paving Co.; Hummock and other streets with macadam, to E. L. Bader.

**Cincinnati, O.**—Paving portion of Pearl St. with granite to John Ruebel Constr. Co., \$10,789.

**Orrville, O.**—Paving two streets to Geo. B. Herring & Son, Mansfield.

**Chattanooga, Tenn.**—McCallie ave. with asphalt to West Construction Co., \$49,-303.15.

**Hamilton, Ont., Can.**—Two road rollers to Watrous Engine Co., Brantford.

#### SEWERAGE

**New Decatur, Ala.**—Bids will be received April 15, 7:30 P. M., for sanitary sewer laterals under four ordinances.—John Patterson, Mayor, pro tem.

**Grand Junction, Colo.**—City Engineer Geo. L. Crawford has completed plans and specifications for sewer Dist. No. 3, including eastern and northwestern portions of city; cost, \$35,000.

**Princeton, Ill.**—Council has decided to extend sewer system.

**Cedar Rapids, Ia.**—Bids will be received April 18, 7:30 P. M., for construction of sewers in three streets.—P. F. Gray, City Clerk.

**Clinton, Ia.**—Bids will be received April 12 for constructing sanitary sewer in block 37; including laying 780 ft. 10-in. pipe, excavating 330 yds. rock and furnishing manhole.—W. E. Hayes, City Clerk.

**Perry, Ia.**—City is considering construction of storm sewers.—Chas. Wilson, City Engineer.

**Lake Charles, La.**—Plans have been completed by Walter G. Kirkpatrick, Jackson, Miss., for proposed sewer system.

**Hancock, Mich.**—Plans for completion of Hancock's sanitary district have been presented to Board of Public Works by City Engineer Craig.

**Albert Lea, Minn.**—Bids will be opened April 15 for construction of 1496 lin. ft. 8-in. pipe sewers, 6-14 ft. deep; 298 lin. ft. 12-in. x 22-in. double pipe sewers, 8114 ft. deep; 320 lin. ft. 12-in. x 20-in. double pipe sewers, 8-12 ft. deep; 210 lin. ft. 10-in. pipe drains; 9 manholes and 6 catchbasins.—William Barneck, City Engineer.

**La Grande, Ore.**—Bids will be received by D. E. Cox, City Recorder, April 20, for \$40,000 sewer bonds.

**Junia, Pa.**—Bids will be received April 12, 8 P. M., for paving, grading and curbing 4th ave.—R. S. Elder, Chairman, Highway Committee.

**Roanoke, Va.**—Bids will be received April 26, noon, for constructing 24-in. sewer drain in Luck ave.—F. L. Gibboney, City Engineer.

#### CONTRACTS AWARDED

**Lawrence, Kan.**—Sewer, Henry st., to Richard Keys, \$1.50 per lin. ft.

**Sedalia, Mo.**—Constructing sanitary sewers and complete sewage disposal works to Wm. F. Hall, Clinton, Mo., \$38,624; T. H. Johnson, Kansas City, \$43,357; A. D. Johnson, Kansas City, Kan., \$42,040, and Midland Bridge Co., Kansas City, \$45,844. Burns & McDonnell, of Kansas City, Mo., Engineers.

**Newburgh, O.**—Sewer and concrete culvert in Hulda ave., to Water Works Constr. Co., Cleveland, \$4,448. W. H. Evers Engineering Co., 237 The Arcade, Cleveland, Engineers.

#### WATER SUPPLY

**Macon, Ga.**—Committee has been appointed to investigate matter of providing city with water.—O. E. Dooly, Chairman.

**East Dundee, Ill.**—Citizens will vote April 19 on \$6,000 bonds for extension of water system.

**Fort Wayne, Ind.**—Bids will be received April 14, 2 P. M., for furnishing 150 tons of 4-in., 6-in., 8-in., and 12-in. c. i. water mains.—F. T. Benoy, Chairman, Board of Public Works.

**Clifton, Ky.**—Bonds, \$12,000, have been

sold for water works improvements.—Wm. L. Glazier will probably prepare plans for improvements.

**Gloucester, Mass.**—Water Commissioners are considering extension of water pipes to Starknought Heights.

**High Bridge, N. J.**—Town will vote April 12 on \$35,000 bonds to increase water system.

**Lestershire, N. Y.**—Town has defeated proposition to issue \$12,000 water works improvement bonds.

**Tarboro, N. C.**—City proposes to extend water and sewer system into annexed district and make other improvements; cost, \$20,000.

**Fargo, N. D.**—Council has adopted plans by City Engineer Crabbe for water main extensions.

**Broken Arrow, Okla.**—Bids will be called after April 10 for construction of water works. P. H. Fox, City Clk.

**Pittsburg, Pa.**—Plans are being prepared by city bureau for filtration of 200,000 gal. gal. reservoir.

**Hubbard City, Tex.**—Union Central Light & Ice Co. desires addresses of manufacturers of water filters.—W. A. Bass, President.

**Ellensburg, Wash.**—Committee has been appointed to investigate securing of water supply.—F. E. Craig, Mayor.—Councilman Stewart, Chairman.

**Ellensburg, Wash.**—South End Water Co. has been incorporated; capital, \$12,000. Geo. De Wees, Chas. Anderson and J. W. Gilliam, incorporators.

**Glacier, Wash.**—The County Comrs. have granted a franchise for a gravity water system to Dr. H. Thompson, T. H. DeHaven and M. F. Myers.

**Priest River, Wash.**—G. C. Sutton has proposed to Council to install 50,000 gal. reservoir.

#### LIGHTING AND POWER

**Dixon, Col.**—E. D. N. Lehe has secured franchise to erect and maintain transmission lines for distribution of electricity for lamps and motors.

**Ft. Lupton, Colo.**—Tiffany & Co., Denver, have secured franchise to construct and operate electric light plant and water works system.

**Crawfordsville, Ind.**—Prof. J. W. Esterline, Purdue University, Lafayette, has recommended to City Council construction of new plant; cost, about \$95,000.

**Troy, Kan.**—Town has voted \$15,000 to secure electric lights.

**Billerica, Mass.**—Town has voted \$1,585 for street lighting.

**Santa Fe, N. M.**—R. H. Boulware and H. B. Johnson have filed applications for water power project to cost \$1,200,000, and asking for 100 second feet of Gila River in western Grant County.

**Russell, N. Y.**—W. G. Popole, Hermon, is interested in construction of system of electric lights; power will be generated from Grasse River.

**Syracuse, N. Y.**—Municipal Heating Co. has decided to ask Council for permission to sell light and power, in addition to steam. T. M. Brooks, Scranton, Pa., President of Public Affairs.

**Rising Sun, O.**—Bids will be received April 14, noon, for construction complete pole line.—H. A. Peffley, Bradner, Consulting Engineer; E. E. White, President, Board of Public Affairs.

**Allentown, Pa.**—Lehigh County Commissioners are considering construction of electric light plant at poor house.

**Charleston, S. C.**—Consolidated Gas Co. is considering construction of free lift holder.

**Nephi, Utah.**—Council is considering installation of entirely new electric light plant.

**Menasha, Wis.**—Merchants are planning to erect eight electric arches along main thoroughfare.

**Brockville, Ont., Can.**—Light and Power Department has petitioned Council for permission to issue \$50,000 bonds for improvements and maintenance of electric light plant.

#### FIRE EQUIPMENT

**Monterey, Cal.**—City Trustees have accepted plans for erection of fire house in New Monterey.

**Hartford, Conn.**—Council is considering erection of engine house in Windsor ave.

**Liberal, Kan.**—Town has no fire protection; purchase of chemical engine considered.

**Louisville, Ky.**—Board of Public Works has decided to purchase new auto for Fire Chief Lehman.

**Saugus, Mass.**—Town will appoint committee to look into reorganizing of fire department, both as to service and equipment.

**Newark, N. J.**—Fire Chief Astley has recommended apparatus for Eighth, Ninth and Sixteenth wards.

**Princeton, W. Va.**—City will purchase 1200 ft. of standard fire hose, three hose reels and three extension ladders.—E. H. Witten, M. L. Carter and I. F. Saunders, Committee.

#### ELECTRIC RAILWAYS

**Florence, Ala.**—Thurston H. Allen, of Florence, is interested in construction of 75-mile electric railway between St. Floridian, Bailey Springs, Muscle Shoals Canal, Rogersville, Athens and Huntsville.

**Oakland, Cal.**—Bids will be received May 2, for purchase of railway franchise.

**Vacaville, Cal.**—City Trustees have granted Vallejo & Northern Ry. Co., Vallejo, a franchise to build electric railway over certain streets.

**Coeur D'Alene, Ida.**—Commercial Club has taken up matter of establishment of street car service from Post Falls to Dalton Gardens.

**Crawfordsville, Ind.**—S. D. Symmes is interested in proposed construction of electric line from this city to St. Louis, by way of the Shades of Death and Terre Haute.

**Minneapolis, Minn.**—Twin City Rapid Transit Co. plans to extend its Chicago ave. line to Lake Amelia, and its Riverside ave. line to 31st st. and Lake st.—W. J. Held, General Manager.

**Rochester, N. Y.**—Buffalo, Lockport & Rochester Ry. Co. is planning extension of its line to Niagara Falls. J. M. Campbell, General Manager.

**Wilburton, Okla.**—Citizens' Street Ry. Co. has been chartered to build a 10-mile interurban electric railway from Wilburton to Paterson and Lutie; capital, \$1,000,000.—Jas. M. Connell, Richard Howard, Benjamin Mills and others, Incorporators.

**Victoria, Tex.**—A street railway franchise for either electric or gasoline cars has been granted to J. J. Welder, F. B. Lander, A. A. Sitterle, J. N. Fagan, T. D. Wood, J. W. Rutland, J. A. McFaddin and J. K. Hexter.

**Welland, Ont., Can.**—Niagara Falls, Welland & Dunnville Electric Ry. Co. has been incorporated to build electric railway from Niagara Falls City through Stamford, Thorold, Crowland, Welland, Humberstone, Walniflet, Moulton and Sherbrooke; capital, \$200,000.—F. R. Lalor, Dunnville, and Franklin Buell, Buffalo, are interested.

#### BRIDGES

**Grantfork, Ill.**—Bids will be received April 12, 10 A. M., for construction of rein. concrete bridge.—J. C. Schwartz, Township Clerk.

**Independence, Kan.**—Bids will be received April 12, noon, for construction and repair of bridges. Address, Clerk of Montgomery County.

**Wichita, Kan.**—Citizens have petitioned for bridge, either concrete arch or steel, with pavement and concrete walks.—Bert C. Wells, City Engineer.

**Billerica, Mass.**—Plans will be prepared for erection of bridge across Concord River.

**Palmer, Mass.**—Citizens have voted \$18,000 appropriation to build a new stone bridge over Chicopee River at Three Rivers.

**Clay Center, Neb.**—Bids will be received April 14, 10 A. M., for bridge lumber for year.—W. K. Newcomb, County Clerk.

**Edenton, N. C.**—Bids will be received May 2, noon, for construction of sub and superstructure of bridge over Shuelick Creek on Xenia road.—J. L. Larkin, Batavia, Auditor, Clermont County.

**Townton, S. D.**—Bids will be received April 9, 10 A. M., for construction of bridges.—E. I. Lampy, Auditor, Codington County.

**Tacoma, Wash.**—City Engineer W. C. Raleigh is urging building of bridge across Puyallup Waterway on tidelands.

#### MISCELLANEOUS

**Michigan City, Ind.**—City Engineer Miles submitted estimate of \$16,000 as cost of proposed dock improvements along harbor.

**Muncie, Ind.**—Board of Works will investigate street sweepers used in other cities before purchasing new apparatus.

**Des Moines, Ia.**—Citizens have voted in favor of establishment of central market house.

**Billerica, Mass.**—Town is considering purchase of watering cart.

**Boston, Mass.**—Council has turned down order calling for loan of \$125,000 for ferry-boat.

**Ventnor, N. J.**—Plans have been accepted by Council for enlargement of city hall; cost, \$15,000.—Vaughn Mathis, Architect.

**Lockport, N. Y.**—Bids will be readvertised for cleaning and sprinkling streets for term of three years.

**Toledo, O.**—Infirmary Director Henry Evans is urging need of separate hospital for tubercular patients.

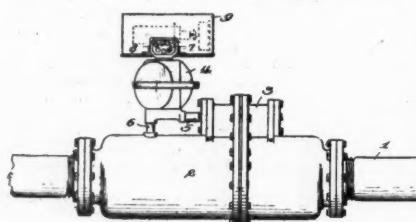
## PATENT CLAIMS

**951,471. BITUMINOUS CEMENT.** Joseph H. Amies, Philadelphia, Pa., assignor to The Amies Asphalt Co., Philadelphia, Pa., a corporation of South Dakota. Serial No. 486,804.

The process of making a binder and cement for road and street surfacing and resurfacing and like uses, which consists in the employment of about from 15 to 60 per cent of solid elements, such as hard asphalt and the like and about 40 to 85 per cent of fluxing elements and mixing the same with a sufficient amount of calcium oxide or calcium hydrate, to secure a desirable binder and cement which will be indifferent to changes of temperature and from which aging is practically eliminated.

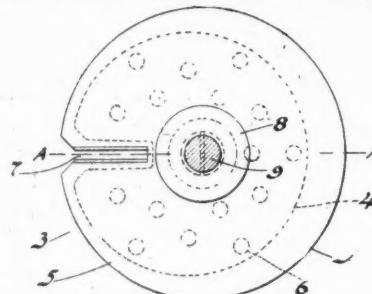
**951,711. VOLUME-RECORDING ATTACHMENT FOR FLUID-METERS.** Henry P. Westcott, Erie, Pa. Serial No. 492,669.

A volume recording attachment for fluid meters attachable to and detachable from the meter as a self-contained unit and comprising a casing inclosing the registering train of the meter tally mechanism, a second casing having an opening into which



the first casing projects, a chart carrier in the second casing, clock mechanism for operating the chart carrier, a marking arm pivoted in the second casing in operative relation to the chart carrier and an element mounted upon a shaft of the registering train for producing the operative movements of the marking arm.

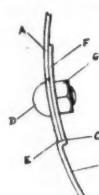
**951,787. NUTATING DISK FOR METERS.** Abram G. Holmes, Pittsburgh, Pa., assignor to Pittsburgh Meter Co., a corporation of Pennsylvania. Serial No. 452,894.



A slotted disk and a reinforcing plate located so that the center of gravity of the disk and the plate together is coincident with the center of the disk.

**951,279. METAL CULVERT-PIPE.** James B. Jarmin, Spokane, Wash., assignor of one-half to John S. Beall, Portland, Ore. Serial No. 473,900.

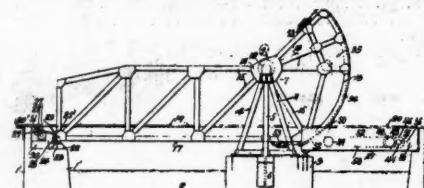
A metal culvert pipe consisting of upper and lower sections, said lower section be-



ing provided with a depression on each side thereof forming a shoulder, said shoulder being adapted to support said upper section, substantially as and for the purpose described.

**952,485. BASCULE-BRIDGE.** John A. L. Waddell and John L. Harrington, Kansas City, Mo. Serial No. 445,124.

In a bascule bridge, a supporting frame, bearing members mounted on the frame



and provided with curved bearing surfaces, an axle having its ends rounded longitudinally and seated upon the curved bearing surfaces, and a counterpoised bridge span revolvably mounted on said axle.

**951,289. WATERPROOFING-SHIELD FOR EXPANSION JOINTS.** Theodore A. Schaffer, New York, N. Y., assignor to Hydrex Felt & Engineering Co., Portland, Me., a corporation of Maine. Serial No. 467,503.

A device for water-shedding, waterproofing and protecting the expansion joints of bridges and like structures, which device consists of a flexible impervious, waterproof shield adapted to lie over an expansion joint with the opposite sides of the former rigidly fastened to the contiguous ends of the bridge sections, and having an intermediate foldable portion passing over and movable in and across the gap between said ends, in combination with a covering over said shield.

## INCORPORATIONS

**Atlantic City Lighting Co.** Atlantic City, N. J.; to operate and maintain for supply and distribution of electricity for electric lighting; capital \$125,000; incorporators: George W. Chandler, William B. Macdonald, Henry L. Chew.

**Cedar Rapids Lighting Co.** Cedar Rapids, Ia.; capital \$10,000. Incorporators: W. H. Borschel, H. B. Baker, Fred A. Bagley, J. P. Ferguson.

**Geco Co.** Borough of Manhattan, New York, N. Y.; general contracting business; capital, \$50,000. Incorporators: George Cody, 2255 83d street, Brooklyn; Thomas O. Piper, East Setauket, L. I.; John M. Macdonough, 233 Lafayette street, New York, and two others.

**Hydroth Company of New York.** Brooklyn, N. Y.; general contracting and construction business; capital, \$20,000. Incorporators: Andrew N. Nielsen, 25 Dean St.; James R. Dowie, 363 Jeff Avenue; John Flint, 1280 Dean St., all of Brooklyn.

**Interurban Construction Co.** Chicago, Ill.; \$60,000; construction of interurban lines and electric railways; I. D. Stevens, C. A. Spenny, Edward B. Harang.

**Spokane Asphalt Macadam Paving Co.** Spokane, Wash.; capital \$10,000. Incorporators: Otto A. Weile, W. A. Corey, W. G. Davidson, Charles A. Smith and Will G. Graves.

**The Water Supply Co.** San Francisco, Cal.; to develop water sites and privileges and build pipe lines in San Francisco; capital \$20,000,000. Incorporators: F. E. Boland, R. H. Kimball, J. A. Allen, J. F. Cassell, H. L. Atkinson, F. S. Mackey, R. A. Wagner.

## FOR SALE

## One Iroquois Mixer

WITH TWO SETS OF BLADES,  
ALMOST NEW. Address

The Impervious Product Co.  
213 St. Paul Street, BALTIMORE, MD

## PROPOSALS

## PAVING

Landsdowne, Pa.

Sealed proposals will be received by the undersigned until 8 P. M., April 22d, 1910, for the paving of all or such portions of Baltimore Avenue as Council may direct, with Shale Blocks, Bitulithic and Asphalt sheet paving, according to specifications which may be procured from Wm. C. Shuster, Jr., Chairman of Highway Committee, 17 South Lansdowne Avenue.

All bids must be accompanied by a certified check for \$3,000, made to the order of the Borough Treasurer, and must be endorsed on outside of envelope "Proposals for Paving Baltimore Avenue."

Council reserves the right to reject any or all bids.

(14) JOHN W. DAVIS, Sec'y,  
22 Runnemede Ave.,  
Lansdowne, Pa.

## PAVING

Sherman, Tex.

Bids will be received at the office of Barney C. Kreager, City Sec'y, Sherman, Texas, for the following approximate amount of paving proposed by the City of Sherman, bids being requested on brick, rock asphalt, bitulithic, creosoted wood block and petroliothic pavings, and in accordance with plans and specifications now on file: 21,650 sq. yds. street paving.

8,432 lin. ft. curbing (concrete or stone).  
491 lin. ft. header (oak or pine).

Bids to be opened May 2d, 1910.

JNO. C. WALL,  
Mayor City of Sherman.

## CEMENT CONCRETE PAVING

Clarinda, Iowa.

Sealed proposals will be received by the City Clerk of the City of Clarinda, Iowa, at his office in the City of Clarinda, Iowa, until 7:30 o'clock P. M., April the 12th, 1910, for the construction of about 20,500 square yards of concrete paving, of 5 inches of Portland cement concrete. Plans and specifications can be had by sending \$1 to the undersigned, or plans and specifications can be inspected by calling at the office of C. W. Stuart, Clarinda, Iowa.

C. W. STUART, City Clerk,  
Clarinda, Iowa.

## GARBAGE CREMATORY

Sealed bids will be received by the Board of Health of the City of Atlanta, Ga., until the 29th of April, 1910, at 5 p. m., for the construction of a crematory capable of destroying 200 tons of garbage in 12 hours. Address G. H. Branden, Sec'y., 101 Marietta St., Atlanta, Ga., for additional information and for specifications.

At the same time and place bids will be received for the construction of two crematories capable of destroying 100 tons of garbage each in twelve hours.

## WANTS

**WANTED**—A first-class cement Curb and Gutter and sidewalk finisher. Must be a good man, others need not apply. Must furnish references. P. O. Box No. 625, Oshkosh, Wis. (12-14)

**WANTED**—A first-class foreman for street paving. Must be a good, honest and reliable man. One who can get the work out. Must furnish references. P. O. Box No. 625, Oshkosh, Wis. (12-14)

**WANTED**—By a sewer contractor having full season's work, man to take charge of tunnel work in shale rock. A2, care Municipal Journal & Engineer.

**BETTER GOODS FOR LESS MONEY**

**HEADQUARTERS FOR WATER WORKS SPECIALTIES**

**THE ONLY  
BRASS GOODS  
GUARANTEED  
5 YEARS  
GLAUBER**

**4900 TO 5100 SUPERIOR AVE., CLEVELAND, O.**

**FOR THE ASKING**

**SAMPLES AND PRICES FOR THE ASKING**

**THE ONLY  
BRASS GOODS  
GUARANTEED  
5 YEARS  
GLAUBER**